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Michael Murdoch,
Notis die, 5. Junii,
1837. Londini.
Firma Fertia. —

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EXPERIMENTS AND OBSERVATIONS
 ON A
 NEW SPECIES OF BARK,
 SHEWING ITS GREAT EFFICACY IN
 VERY SMALL DOSES:
 ALSO A
 COMPARATIVE VIEW
 OF THE POWERS OF THE
 RED AND QUILLED BARK;
 BEING AN ATTEMPT TOWARDS A
 GENERAL ANALYSIS
 AND
 COMPENDIOUS HISTORY
 OF THE VALUABLE
 GENUS OF CINCHONA,
 OR THE
 PERUVIAN BARK.

By RICHARD KENTISH, M.D.
 MEMBER OF THE ROYAL MEDICAL SOCIETY
 AT EDINBURGH,
 CORRESPONDENT MEMBER OF THE SOCIETY
 OF SCOTTISH ANTIQUARIES, &c. &c.

Amicus Plato, amicus Socrates, sed magis amica veritas.

L O N D O N:
 PRINTED FOR J. JOHNSON, (NO. 72) ST. PAUL'S
 CHURCH-YARD. 1784.



E R R A T A.

Page 16, line 15, *dele* with fixed alkalies.

- 36, 6, *after circumst. read same.*
 44, 24, *read Lucix.*
 50, 3, *for that I forgot, read as to make me forget.*
 57, 4, *in the note, for this mixture, read the latter.*
 46, 11, *read should the period of its fame ever arrive.*
 64, 22, *to two—the liquor then strained.*

T O

D.R. JOSEPH BLACK,

PROFESSOR OF CHEMISTRY IN THE
UNIVERSITY OF EDINBURGH.

S I R,

WHATEVER may be the motives of the present dedication, the greatness of your character will acquit me of the crime of flattery.—He who has not had the advantage of your instruction, has lost an opportunity of improvement which in vain is sought from others.—He who has profited by it will feel a conscious pleasure; and he who possesses your esteem and friendship, enjoys a happiness, which

to preserve, shall be the pride and
constant endeavour of,

S I R,

With the most unfeigned respect and gratitude
for all public and private favors,

Your most obliged,

obedient, and

very humble servant,

Huntingdon,
Sept. 8, 1784.

RICHARD KENTISH.

P R E-

P R E F A C E.

THE Author cannot send this publication into the world without apology. The subject is important, and deserves attention from the friends of science. A new remedy cannot be introduced into general practice by the labours of an individual, the concurrence of practitioners is necessary; and the united efforts of physicians are required, to establish the reputation of a new medicine. The author has here endeavoured to discharge the duties of his profession, and of society. He has attempted to improve the science of physic, by the addition of a powerful remedy. He has attempted to illustrate the nature of a vegetable, which had been misrepresented; and to ascertain the action of a medicine,

cine, which false theory had obscured. His performance, not his endeavour, needs apology; and he trusts the candour of judicious criticism will overlook the execution in the merit of attempt.

The present situation of the author is a great inducement to the publication of his observations. The country where he now resides, is peculiarly infested with intermittents, remittents, and other diseases in which the bark has been esteemed efficacious; and from the accounts of the medical practitioners, no part of his Majesty's subjects annually consume more bark than the inhabitants of *Huntingdonshire*. This consideration has induced the author to pay particular attention to the diseases of a country, where he means to practise

ἐπιβλέπειν ἐν δεῖ καὶ χῶρην, καὶ ὥρην, καὶ ἡλικιήν καὶ νασῶς
ἐν ἧσι δεῖ, ἢ ὅ*.

The great advantages which will result from the general introduction of the *Cinchona Sanctæ Luciae* into general

* ΠΠΟΚΡ. ΑΦ. β.

practice, are very manifest. Its importation into this kingdom will be readily obtained, its price will be trifling, and the smallness of its dose will be its principal recommendation. Few stomachs will revolt at the sight of gr. v. or gr. x. of a powder; but English stomachs are in general too delicate to bear whole drams thrown down at once, which has been the case with the quilled and red species of cinchona.

To consume more time in preface would be unpardonable. The author therefore submits to the examination of *candid criticism* the following thoughts, which, whatever be their fate before the public tribunal, he trusts that it will not lessen that esteem, of which he is proud to boast from a scientific few. “ It is the duty of every man, “ to endeavour that something may be “ added by his industry to the hereditary aggregate of knowledge and “ happiness. To add much can indeed “ be the lot of few; but to add something, however little, every one may hope;

“ hope ; and of every honest endea-
 “ vour, it is certain, that, however
 “ unsuccessful, it will be at last re-
 “ warded.” Rambler, No. 129.

CON-

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EXPE-

EXPERIMENTS AND OBSERVATIONS

ON THE

GENUS OF CINCHONA,

OR THE

PERUVIAN BARK.

SECTION I.

ON THE CINCHONA OFFICINALIS, OR
QUILLED-BARK.

C H A P. I.

*Introduction—Vegetable Arrangement—and
General History.*

EVERY age of Medicine has had its favourite remedy, and every school of Physic has added something to the increase of the *Materia Medica*; the articles of which, like the instruments of mechanics, have been multiplied and diversified, whilst

B

the

the principles on which they acted were altogether unknown, or misunderstood. Remedies have been handed down from the days of Hippocrates with unremitting care; and as if the study of physic consisted in “culling simples,” volumes have been written on articles which time has made obsolete, and reason laid aside. The botanists boasted simple specifics; the chemists their compound panaceas. Thus has the science of medicine been styled an art, and the art of healing supposed to consist in the knowledge of drugs, or the possession of secrets. Philosophy has alternately lent her assistance to the introduction and expulsion of such opinions. Experiments have been cultivated, and experience has confirmed their utility; but mistaken notions of the animal œconomy have placed too great confidence in these researches, and even chemical investigation has been productive of false theory and futile practice.

Shall we not then presume to enquire into the nature, principles, or *modus operandi* of medicines? Is every search after causes vain? Is human knowledge so confined? Is the *capacity* for science so small, that we must
rest

rest satisfied with ignorance, and shut the avenues of wisdom? Heaven forbid! Though ultimate causes may for ever escape human eyes, yet enquiry is the privilege of reason; and the examination of effects, as causes of other effects, will tend to improve the heart, and enlighten the mind. Knowledge is the attribute of Deity, and the characteristic mark of man; it is what places him above other animals, sets him at the head of creation, and makes him lord of all. “*Quid enim est per Deos optabilius sapientia? Quid homini melius? Quid homine dignius? Hanc igitur qui expetunt philosophi nominantur; nec quidquam aliud est philosophia, si interpretari velis, quam studium sapientiæ.*” Cic. de Off. l. 2.

The present age is happy in an improved philosophy; and as every system of philosophy has had its contemporary system of physic, so is medicine peculiarly fortunate in these days, to have received improvements, and verged towards perfection. The last fifty years have added more to the healing art, than five preceding centuries. Physiology has been explored, pathology improved,

and principles in medicine, like principles in philosophy, attempted. Mistaken notions of diseases have been detected, practice corrected, and theory improved. The specifics, the panaceas of former ages, have sunk into oblivion. One, but one of the vegetable tribe remains, to which modern practice allows the name: this perhaps is usurped, and custom, not experience, sanctions the appellation. Of words I will not dispute. Whether *the Bark* is a catholicon, or entitled to the name of specific, at present is of no importance: its efficacy has established its reputation, and my experiments tend not to defame it.

So much has been already written upon this drug, that it may seem to require apology from any one who shall attempt to pursue the subject. Every medical practitioner, every dabbler in physic, nay every *old woman* in the country, knows the use of bark. It may therefore appear mispent time, and an affront to the literati of the present age, to suppose that my performance will be read: “ Omnibus enim temporibus fama & opinionione vulgi, sagæ & aniculæ & impostores, “ medi-

“ medicorum quodammodo rivalet fuere, &
 “ de curationum celebritate cum iisdem fere
 “ certarunt.” Verulam, l. iv. c. 2.

Were my observations confined to the common species of cinchona, I should indeed be open to censure, and liable to be thought presumptuous; but my experiments have not been so confined. I have attempted to lay down clear ideas respecting one species now much in use, but the nature of which has been misunderstood, and a species likewise hitherto entirely unnoticed by English writers has been the object of my enquiry.

Not therefore to spend more time in apologizing for my performance, which must live or die by its own merit, I shall proceed to the first part of my work, and offer from Linnæus a botanical description of the genus of cinchona, or the Peruvian bark.—The tree which produces this bark is classed among the Pentandria Monogynia, and the following is given as its definition.

Cinchona : *Quinquina* Condamin. Aët.
 Gall. 1738.

Cal. Perianthium Monophyllum, superum,
 quinquef. minim. persistens.

Cor. Monopetala, infundibuliformis. Tubus cylindraceus, longus. Limbus patulus, quinquef. acutus.

Stam. Filamenta quinque minima, antheræ oblongæ intra faucem corollæ.

Pist. Germen subrotund. inferum. Stylus longitudine corollæ-stigma crassiuscul. oblongum simplex.

Per. Capsula subrotunda, Calyce coronata bilocularis à basi versus apicem bifariam dehiscens.

Sem. Plurima, oblonga, compressa, marginata.

Obf. Flos interdum demit quintam partem numeri in singulis partibus.

Such is the character of the genus, and of the species Linnæus enumerates but one, *Cinchona* (*officinalis*) *panicula brachiata*. L. Sp. Pl. 244.

If we are not mistaken, we are at present acquainted with two other species, but we shall speak first of the *officinalis* or *quilled Peruvian Bark*. Several authors have given the history of this article; we shall prefer that of Neumann, which we shall beg leave to give in his own words. “Cortex Peruviani-
“anus,

“ anus, called from its efficacy against inter-
 “ mitting fevers Febrifugum Peruvianum,
 “ cortex antifebrilis & antiquartius; and from
 “ a cure performed by it on the lady of
 “ Count del Cinchon, viceroy of Peru, cor-
 “ tex china china, or chinchina, kinkina,
 “ quinquina, comitissæ, &c. was first brought
 “ into Europe in the year 1649, by Cardinal
 “ de Lugo, who was then the Spanish vice-
 “ roy in the West Indies. It continued for
 “ some time a very lucrative secret in the
 “ hands of the Jesuits, who reduced it into
 “ powder, the better to disguise it, and sold it
 “ for its weight in gold: whence its names
 “ Pulvis Jesuiticus, Pulvis Patrum, Pulvis
 “ Cardinalis de Lugo*. The tree called
 “ by

* “ Ce ne fut comme on fait, qu’en 1649, que l’on
 “ commença à avoir quelques notions du quinquina par
 “ les relations du Cardinal de Lugo & des Jesuites à leur
 “ retour en France. Trente années s’écoulerent encore
 “ depuis cette époque avant que les medecins se determi-
 “ nassent à le prescrire aux malades avec cette confiance
 “ que meritent en général les specifics & qu’il a acquis
 “ depuis. En 1679 un Anglois nommé Talbot, le mit
 “ en vogue, & Louis le grand acheta de lui la maniere de
 “ le prescrire & ses doses. Depuis cette époque jusqu’à
 “ ce jour le Perou seul étoit en possession de fournir du
 “ quinquina à l’Europe, & on n’avoit point encore fait

“ by Ray *Arbor febrifuga Peruviana*, china
 “ china, & quinquina & ganaperide dicta,
 “ is plentiful on the hills near the city Loxa,
 “ in the province of Quito in Peru. It is
 “ said that the trees which grow at the
 “ bottom of the hills have the thickest bark,
 “ smooth and whitish on the outside, clear
 “ or yellowish brown within, the least bitter
 “ and of the least virtue; that the bark of
 “ those on the top is somewhat bitterer,
 “ thin, full of protuberances, of a blackish
 “ colour on the outside, and of a dark brown
 “ within. That those produced about the
 “ middle height yield the bitterest and best
 “ bark, not so smooth and pale coloured as
 “ the one, nor so rugged and dark coloured
 “ as the other. Vaillant, a celebrated bota-
 “ nist at Paris, assured me that he knew six
 “ sorts, and confirmed the account given by
 “ Lemery* and Pomet, that Potosi affords
 “ the

“ usage de celui qui croit dans d'autres contrées. Il en
 “ existoit cependant à Saint Domingue, dans le Nouveau-
 “ Mexique & à la Martinique.” Vid. Journ. de Phys.
 Marf. 1781. (M. Mallet.)

* “ Est l'écorce d'un arbre appelé kinakina ou canna-
 “ perida, qui croit au Perou dans la province de Quito,
 “ sur

“ the best ; that this is much browner,
 “ bitterer, more aromatic and more pungent,
 “ than the bark of Quito. But our business
 “ is to chuse the best of what is brought to
 “ us. This is externally of a blackish brown,
 “ and internally of a dark cinnamon colour,
 “ somewhat unequal on the surface ; com-
 “ pact, firm, and not easy to break ; of a
 “ moderately bitter, astringent taste, with a
 “ mixed kind of aromatic and musty flavour.
 “ The large thick pieces are seldom good.
 “ Those which are rolled up into quills like
 “ cinnamon, are apt to have foreign matters
 “ lodged within, and therefore should be
 “ broke and examined before we pulverize
 “ them for use.” Vid. Lewis’s edit. of
 Neum. Chem. p. 90.

“ sur des Montagnes proche la ville de Loxa ; il est à peu
 “ près grand comme un cerisier : ses feuilles sont rondes,
 “ dentelées, sa fleur est longue, de couleur rougeatre, elle
 “ est suivie d’une gousse qui contient une amande plate,
 “ blanche, envelopée d’une membrane mince. Il y a deux
 “ espèces de kinakina, l’un est cultivé & l’autre sauvage,
 “ le cultivé est de beaucoup preferable à l’autre, les
 “ Espagnols l’appellent palo de calenturas, c’est-à-dire le
 “ bois des fièvres.” Vid Lemery’s Dictionnaire ou Traité
 Universel des Drogues Simples, p. 287.

The

The conciseness of this history will probably be a recommendation, and I shall be excused from entering more minutely into circumstances which border greatly on conjecture. Accident has given rise to the introduction of many remedies; and the story of an Indian being cured of an ague by drinking at a pond, into which some trees of the cinchona had accidentally fallen, wears some degree of probability, as we are well acquainted with the good effects of a cold infusion: but whoever wishes to investigate more fully the history of this article, may consult the authors on this subject, the principal of whom are comprized under the following:

SYNONIMA OF THE BARK.

Cortex. Cortex Peruv. china china, quinaquina offic. Arbor febrifuga peruviana, Jonsf. de Dr. 476. Arbor febrifuga peruviana: China chinæ, & quinquina, & gannana peride dicta: Hispanis palos de calentura: Cortex arboris, Cortex peruvianus vulgo dicitur, inque pulverem redactus, pulvis patrum (scilicet jesuitarum) & pulvis Cardinalis de Lugo; Angliæ the Jesuit's Powder, R. H.

1796.

1796. China chinæ, Schroederi, App. p. 30.
 Cortex peruvianus, seu china chinæ, Morton,
 pyrit. elog. exercit. 1. c. vij. Cortex peru-
 vianus, peruanus, China chinæ, quinquina
 offic. Dale 291. Kina-kina, Cortex peruvi-
 anus, & cortex febrifugus offic. Vulgo
 Quinquina, Geoff. Mat. Med. 11. 179.
 Arbre de quinquina, Mem. Acad. R. 1738,
 p. 319. Cinchona Lin. G. P. 1021, p. 526.
 The Jesuit's bark, or the bark, or Peruv.
 bark. Vid. Quinaquina, Alston's Lect. on
 Mat. Med. Lect. 47. p. 11. Vol. II. by Dr.
 Hope. Kinakina, kinaquina, chinachina,
 chinacanna, Lemery, p. 287.

C H A P. II.

Experiments on the Cinchona Officinalis.

I SHALL esteem it altogether unnecessary
 to present a detail of the labour of others
 on this subject. Mr. Boulduc, Lewis, and
 Dr. Percival have thrown considerable light
 on this and other articles of the Materia
 Medica, but I know of no author that has
 given the general analysis which I here at-
 tempt. Of what has already been done, I
 shall

shall have to take notice in different parts of this work, and shall therefore proceed to relate my experiments in the following order :

WITH WATER.

Exp. 1. Half an ounce of the best common Peruvian Bark, reduced to fine powder, was infused twenty-four hours in eight ounces of pure distilled water. The infusion was of a light, yellowish brown colour, and had a pleasant, aromatic, astringent, and slightly bitter taste *.

WITH WATER AND HEAT †.

Exp. 2. Half an ounce of the same bark in coarse powder, was boiled in one pound
and

* M. Mallet, whose name we shall have frequent occasion to mention under the article quinquina-piton, has given us some experiments on the common species of the bark, with which we shall here present the reader.

“ 1. Deux onces de quinquina du perou grossierement
“ pulvérisé, mis en macération dans deux pintes
“ d’eau froide, le mélange souvent & fortement agité
“ pen lant huit jours, il s’en degagea une grande quantité
“ d’Air qui produisit une mousse abondante. Cette
“ liqueur filtrée par un papier gris, parut jaunatre, louche.
“ & amère.”

† “ 2. Une chopine d’eau bouillante, versée sur le résidu
“ et filtrée, douze heures après, donna une liqueur, plus
“ jaune

and an half of pure distilled water, to half a pint, then passed through a linen cloth and set in a cool place. In twenty-four hours the liquor was found more opake than in the former experiment; of a beautiful yellow, brown colour, and of a much more bitter taste. A copious precipitation was observed at the bottom of the vessel.

“jaune & plus amère, la même infusion reiterée fournit
“une liqueur à peu près semblable.”

“3. Le même résidu soumis à une ebullition de sept à
“huit minutes dans une chopine d’eau, & reiterée trois
“fois, le produit des deux premières decoctions étoit
“d’un jaune foncé, trouble d’une saveur amère & le pro-
“duit de la troisième, étoit plus foible à l’oeil & au gout
“que les deux autres.”

“4. Le même résidu, après avoir été arrosé d’eau
“bouillante versée à plusieurs reprises, jusqu’ à lui oter
“toute saveur, fut mis en digestion dans un peu d’esprit
“de vin, auquel il donna une couleur ambrée sans amer-
“tume : on mit ensuite le feu au résidu, qui brula très
“promptement sans repandre d’odeur particuliere, & ne
“fournit pas un atome d’alkali fixe par l’incineration.

“5. Toutes les liqueurs qui ayant servi aux infusions,
“& lotions, reunies et formant environ quatre à cinq
“pintes furent filtrées, passèrent très lentement, et furent
“mises ensuite à évaporer. Elles se troublèrent beaucoup
“pendant cette opération, furent refiltrées deux fois; &
“enfin, l’évaporation terminée, elles laisserent sur une
“assiette de fayance deux gros d’un extrait sec, brillant,
“s’humeçant à l’air. Journal. de Physique, Mai 1780.

WITH PROOF SPIRIT.

Exp. 3. One ounce of the same bark in coarse powder, was infused in eight ounces of proof spirit for fourteen days, the vessel being frequently shaken. On examination, it was found of a beautiful dark brown colour, perfectly transparent, and had the bitter astringent taste of bark. On the addition of water, it became turbid, resembling, in appearance, the decoction; and on standing at rest some time, let fall a copious precipitate, leaving the liquor transparent.

WITH ACIDS.

Exp. 4. One scruple of the bark in powder, was infused in spt. vitrol. ten. ʒi . for the space of twenty-four hours. On examination, it had acquired very little colour; and when diluted with water, had only an acid taste.

Exp. 5. To one scruple of the same bark was added aq. fort. dup. ʒi . In twenty-four hours the whole substance of the bark disappeared, and a yellow matter, something like ambergrise, was found floating on the surface, and sticking to the sides of the vessel. On the addition of water, the taste
was

was only acid, but on the addition of alkali the liquor changed from a yellow to a brown colour, and the bitter taste of the bark was perceptible.

Exp. 6. To one scruple of the same Peruvian bark, was added one ounce of *spt. fal. marin.* In twenty-four hours it had acquired a slight blackish tinge; had no taste of the bark when diluted with water; but on the addition of alkali, a very slight bitter was perceived.

Exp. 7. One scruple of the same bark was infused twenty-four hours in one ounce of *acetum distillatum*, the colour was scarcely changed, and it appeared to possess no properties of the bark.

WITH ALKALIES.

Exp. 8. One scruple of the best common Peruvian bark, in powder, was infused with the same quantity of vegetable alkali, in one ounce of water. In twenty-four hours the infusion was of a beautiful dark brown colour, but had no taste of the bark. The addition of acid produced a slight bitter taste.

Exp. 9. One scruple of the same bark was infused in an ounce of water, with a scruple
of

of fossil alkali. The colour of the infusion and other circumstances, were nearly the same as in the former experiment.

Exp. 10. One scruple of the same bark, in powder, was infused in one ounce of spt. corn. cervi. In twenty-four hours a dark brown pellicle floated on the top of the liquor, which was transparent, and of a brown colour. A kind of precipitation was observed on the sides of the vessel, especially near its bottom. When diluted with water it had no taste of the bark; and on the addition of acid, the bitter taste was less perceptible than in the former experiments.

WITH FIXED ALKALIES.

Exp. 11. To one scruple of the bark, in powder, was added one ounce of spt. fal. ammon. c. calce. In twenty-four hours a beautiful dark brown colour was produced, and something like a deposition or precipitation seemed to have taken place. When diluted with water, no taste of the bark was perceptible; but on the addition of acid, a bitter taste was perceived more manifestly than in any of the former experiments.

WITH

WITH NEUTRAL SALTS.

Exp. 12. One scruple of the bark was infused with one scruple of nitre, in one ounce of water, for twenty-four hours, during which time it had acquired little colour, and less taste.

Exp. 13. Of cream of tartar, and the best common bark, in powder, each one scruple, was infused in one ounce of water for twenty-four hours : the infusion had acquired little colour, but a slight bitter taste.

EXPERIMENTS ON THE SIMPLE INFUSION
OF BARK.

Exp. 14. To two ounces of the infusion, prepared as in Exp. 1. were added gtt. x. of the tinct. martial. A dark inky colour, resembling that with the infusion of galls, and chalybeates, was instantaneously produced, and a copious precipitation was observed, after the mixture had remained at rest some hours.

Exp. 15. To two ounces of the same infusion were added spt. vitriol. ten. gtt. xx. The liquor was rendered turbid, and a slight precipitate was let fall. The acid taste was not considerable.

EXPERIMENTS ON THE SIMPLE DECOCTION OF BARK.

Exp. 16. To two ounces of the decoction prepared as in Exp. 2. and poured off without shaking the phial, after having stood twenty-four hours, were added gtt. x. of the tinct. martial. The black colour and precipitation, were greatly inferior to the same experiment with the infusion.

Exp. 17. To two ounces of the decoction, were added gtt. xx. of spt. vitriol. ten. The acid taste was less prevalent, and the precipitation more copious than in the same experiment with the infusion.

EXPERIMENTS ON THE TINCTURE OF BARK.

Exp. 18. To one ounce of the tincture prepared as in Exp. 3. were added gtt. x. of tinct. martial. The mixture very soon became of a deep inky black colour, and let fall a copious precipitation.

Exp. 19. To one ounce of the same tincture, were added gtt. xx. of spt. vitriol. ten. The mixture was rendered turbid, and a copious deposition ensued.

MISCELLANEOUS EXPERIMENTS.

The following experiment was made, with a view of ascertaining the quantity of resinous extract yielded from the quilled bark.

The experiment was conducted with great care in the laboratory of a druggist in London.

Exp. 20. Four pounds of the best bark, in coarse powder, were put into a large glass retort, to which were added four gallons of rectified spirit of wine. The vessel was then placed in another large vessel of water, over the fire, and kept nearly in a boiling heat for 24 hours.

As the spirit distilled over it was again returned, and the process thus continued till the whole was thought to be fully saturated. It was then evaporated, and *eight ounces* of resinous extract obtained. This is the common method used by the druggists for obtaining the spirituous extract, but was here conducted with particular caution.

Exp. 21. One pound of the best quilled bark, in coarse powder, was boiled in two gallons of water. The liquor filtered and evaporated to the common pilular consistence, was found to yield five ounces, two drams, two scruples, and seven grains of gummy extract.

Exp. 22. One dram of lean raw beef was suspended by a thread in a phial, containing two ounces of the infusion of quilled bark. The meat continued four days perfectly sweet, though it was exposed in a window to a south-west aspect. The same quantity of meat kept in similar circumstances, in two ounces of water, as a standard to this and the other experiments on the red and Caribbæan bark, was putrid in twenty hours. On the fifth day, the beef in this experiment with common bark, began to smell fœtid, and on the sixth was perfectly putrid*.

Exp. 23. Half an ounce of quilled bark in powder, was infused in four ounces of red-port wine. In four days the colour of the liquor was very little changed. The taste was agreeably bitter, and a black colour produced on the addition of chalybeates.

* This experiment shews, that the infusion of common bark is more antiseptic than either the red or Caribbæan bark. Dr. Saunders informs us, that Mr. Skeete had found the red bark more antiseptic than the common: I have the highest respect for my friend Mr. Skeete's abilities, but must doubt his accuracy in this experiment. I had instituted a set of experiments on the antiseptic powers of the decoctions, but an accident prevented me from drawing any conclusion on the comparative virtues of each.

Exp. 24. Half an ounce of quilled bark in powder, was infused in four ounces of white-port wine. In four days the liquour had acquired an agreeable bitter taste, and struck a black colour with chalybeates.

These are all the experiments which I shall at present relate. Many more were made, and more might be suggested, but the present will answer the purpose of the present enquiry. We shall therefore proceed to lay before the reader, the conclusions which we have deduced, in the following chapter.

C H A P. III.

Conclusions from the Experiments.

WE shall now attempt to draw some conclusions from our experiments, and in this chapter endeavour to investigate the nature and properties of the Peruvian bark. The following appear to us natural inferences.

1. The *cinchona officinalis* is a powerful astringent,

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2. This principle resides in a gum which is soluble in water, and more readily by cold maceration than coction.

3. The Peruvian bark contains a bitter principle, which is a resin.

4. The astringent gum and bitter resin are so combined, that by the assistance of the former, part of the latter is suspended in water, even by cold maceration.

5. Coction extracts powerfully the resin, though it evaporates or diminishes the astringent principle.

6. Proof spirit dissolves both the astringent and bitter principles, and is the only proper menstruum of the latter.

7. Vinous spirit has the same effect as proof spirit, though in a less degree.

8. Concentrated acids entirely corrode or dissolve the bark. The weaker acids have little effect on the substance of the bark, and when added to its solutions in water or spirit, precipitate its active parts.

9. Common alkalies prevent its solution in other menstrea; volatile alkali does not extract its virtues; and caustic volatile alkali forms but a weak preparation.

10. The

10. The Peruvian bark is a powerful antiseptic. Of what advantage these facts are to medicine, medical practitioners must decide. They differ in some measure from the conclusions which other writers have drawn; but accuracy in experiment, must here be considered as the test of truth. It is with great deference that I mention the respectable authority of Dr. Percival, from whom I am obliged to differ. “ The Peruvian bark, says
 “ he, and many other vegetable bitters and
 “ astringents, yield their virtues as perfectly
 “ to cold, as boiling water.” If the astringent and bitter principles be different, and the latter a virtue of the Peruvian bark, undoubtedly the Doctor has erred in his conclusions. Again, he says, “ 2. As much of
 “ the resin of the bark is dissolved by cold
 “ maceration as by coction.” The bitter taste of the decoction, compared with the infusion, is sufficient objection to this conclusion; but the decoctions of the red and Caribbæan bark, put it beyond all doubt, that the bitter principle is more copiously yielded by coction than cold infusion. In the latter species of bark, we have described the presence of the resin so plentiful in the decoction, as to

be precipitated from it in lumps on the addition of acid. The candour of Dr. Percival will readily excuse these remarks, which we shall not attempt at present to enlarge. A comparative view of the powers of the different species of cinchona, will more properly be made in another place; we shall therefore hasten to our experiments on the red bark in the next section.

SECTION

SECTION II.

ON THE CORTEX RUBER, OR RED PERUVIAN BARK.

CHAPTER I.

The History of the Red-Bark—Reasons for believing it to be the Produce of the same Tree as the Quilled—Arguments in favour of its being a different Species of the Genus Cinchona.

THE first author who recommended the use of the red-bark, was Dr. Saunders, physician to Guy's hospital in London. His pamphlet has gone through several editions, and the medicine has come into pretty general use. At first sight it may appear absolute scepticism, a kind of arrest on the judgment of practitioners, to hazard one word against this favourite remedy; but public opinion is always liable to public examination, and every unprejudiced person will candidly examine each side of a subject that even admits dispute. Great as that gentleman's fame may be as a chemist and as a teacher of chemistry,

chemistry, I hope to make it appear, that he has been at least mistaken in his account of the red-bark; but we shall not at present speak of its medical or chemical virtues. The natural history of this bark, is at present involved in some obscurity. Its late introduction into this kingdom appears to have been the effect of chance. “ In the year
 “ 1779,” says Dr. Saunders, “ a Spanish ship
 “ from Lisbon bound to Cadiz, was taken
 “ by the Huzzar frigate, and carried into
 “ Lisbon; her cargo consisted chiefly of this
 “ bark, some part of which was immediately
 “ imported into this country, and a con-
 “ siderable quantity was bought at Ostend,
 “ at a very low price, by some of our
 “ London druggists. The boxes in which
 “ it was brought to Europe, were of the
 “ same kind as those in which the common
 “ Peruvian bark was contained, and all sold
 “ by the general title of *Quinquina*. The
 “ druggists in whose hands this red-bark at
 “ first was, found it difficult to dispose of it,
 “ its appearance was so very unlike that of
 “ common bark; at last they offered it by
 “ way of trial, to such apothecaries as resided
 “ in counties where agues are frequent; the
 “ success

“ success attending its use,” adds the Doctor,
 “ soon convinced them of its superior effi-
 “ cacy*.”

There is no doubt but this remedy, soon after its importation into England, was introduced to the attention of medical practitioners ; but as its fame appears now very much upon the decline, we may probably attribute its universal reception more to the notice taken of it by Dr. Saunders in his publication, than the real efficacy of the medicine. The red-bark is in much larger and thicker pieces than the common Peruvian bark. It appears to consist of three distinct layers. The external coat is generally of a reddish brown colour, though sometimes it has a light-coloured appearance, and is covered with a species of lichen or mossy substance. The internal surface is of a deep red colour, and generally of a resinous appearance. The middle layer is generally the thickest, most compact, of the darkest red colour, and appears to contain most resin. The innermost coat has generally the most fibrous appearance, very often is of a bright red colour, and appears woody.

* Vid. Dr. Saunders's pamphlet, p. 16.

In the first edition of his work, Dr. Saunders thought this bark was taken from the larger branches of the same tree that yields the quilled. The chief of his arguments were drawn from the analogy of other barks : thus the larger branches of the oak are said to yield a bark, redder, rougher, and more astringent, than the smaller twigs of the same tree. Tanners are said to prefer the larger oak bark ; and the Doctor says, “ I have
 “ found, by comparing infusions of both,
 “ and submitting them to the most decisive
 “ experiments regarding their astringency,
 “ by adding to them solutions of iron,
 “ that the precipitates were of a blacker
 “ colour and in greater quantity, from the
 “ larger and more compact pieces of bark,
 “ than from the smaller twig-bark.” Pag. 7.

The last would undoubtedly be a strong argument, if the fact was as Dr. Saunders has represented ; but if any faith is to be given to our experiments, the common bark is more astringent than the red : hence, admitting the assertion that the largest pieces of oak-bark are the most astringent, the argument falls to the ground, and there is no analogy in the case. The proof of the
 Doctor's

Doctor's opinion, that the two barks are the produce of the same tree, proved so slight, that he relinquishes the idea in his last edition, and believes the red-bark to be either a variety or species distinct from the quilled. We are ready to give our assent to this opinion, which appears to be confirmed by a number of arguments. The royal medical society at Paris has, since the death of M. Joseph de Jussieu, received several interesting observations relative to the cinchona. This M. Joseph de Jussieu, was brother to the celebrated botanist Bernard de Jussieu, and one of the French academicians who went to Quito in Spanish America, in order to ascertain the figure of the earth. Dr. Antony de Jussieu, his nephew, gave these valuable communications to the society; from which it appears, that there are more species of the cinchona than what M. de la Condamine has described. He speaks of a red, yellow, and knotty bark, all of which have very smooth leaves, purplish-coloured flowers, and an inodorous bark, bitter to the taste, and more or less coloured. The tree that produces the red is said to be exceeding scarce. In the year 1739, M. de Jussieu found it growing in a very few places
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in the neighbourhood of Loxa. M. de Jussieu seems to have preferred the red-bark; but it is a well known fact, that the inhabitants of Peru give the preference to the yellow and knotty; a circumstance which ought to have some weight with those who wish to try a remedy, of which they have had no experience. The yellow and knotty barks are said to be diminishing so fast, that it is to be feared that they will become extinct in that part of the world; and probably this may be one cause of the late importation of the red species into Europe, rather than any great estimation of its virtues; which would undoubtedly have occurred to the observation of the inhabitants of Peru long before the present period, if such virtues had existed.

The same communication informs us of a species of white bark, which includes four varieties, all of which have broad, roundish, hairy leaves: the flowers are red, odoriferous, and furnished with hairs on their inside surface. The outer bark has a whitish appearance, and the fruit is longer than that of the former species. The inner leaves in two of these varieties are of a reddish colour. They have a slight bitter taste, and are said

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to have a febrifuge quality when fresh, but which they soon lose. The other two are white, and their bark insipid, and of no efficacy. The trees that produce the yellow and knotty barks, were found growing in a valley that extends along the chain of the Andes, and in the district of Yungas, which is near it. About Loxa, in the fourth degree of S. lat. M. de Jussieu saw forests of these trees ; and we have the pleasure to learn, that this valuable vegetable has been discovered in about the same degree N. lat.

Don Casimir Ortoga, professor of botany at Madrid, has lately, by order of the Spanish minister for the American department, sent specimens of two species of cinchona to the royal medical society at Paris, which were lately discovered in the province of Santa-Fe in America, 4 deg. and half North lat. One of these species resembles a specimen of red-bark, now in M. de Jussieu's *Hortus Siccus*, which was sent by M. la Condamine from Peru ; the other is a white bark. As a river that runs through the province of Santa-Fe empties itself near the harbour of Carthagena, we may hope to reap the benefit
of

of this discovery *. This is all the information we have been able to collect respecting the different species of bark; and as we can no longer entertain a doubt of there being several species as well as varieties of the cinchona, the probability is, that the red-bark is a different species from the quilled.

The red-bark has hitherto been the subject of few publications. Mr. Rigby, an ingenious surgeon at Norwich, has published a number of cases greatly in its favour; but he relies so much on Dr. Saunders's experiments, as to judge it "unnecessary to give a chemical analysis of it." An apothecary at Bruges has lately published a pamphlet on this article, in the Flemish tongue, but I was not fortunate enough to procure it in Flanders. An ingenious gentleman of Bruges, whom I met with at Ostend, described it as a nonsensical jargon of words; but I must reserve my opinion till I receive the performance, which I hope to do, with some other publications from the Continent, very soon. I know of no other author on

* Vid. Dr. F. Simmons's ingenious Letter to Dr. Saunders, p. 168. last edit.

this subject. Having therefore availed myself of the writings of others in this chapter, I proceed in the next to offer my experiments on this bark, in the same order as I did in the first part of this work on the quilled species.

C H A P. II.

Experiments on the Red Peruvian Bark.

WITH WATER.

Exp. 1. **H**ALF an ounce of genuine red bark, reduced to fine powder, was infused twenty-four hours in eight ounces of pure distilled water. The liquor was found of a slight red brown colour, had a more bitter but less astringent taste than the same experiment with the common bark.

WITH WATER AND HEAT.

Exp. 2. Half an ounce of the same bark, in coarse powder, was boiled in one pound and half of pure distilled water, to eight ounces, then passed through a linen cloth and

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set

set in a cool place. In twenty-four hours, the liquor was found more opaque than the infusion. Compared with the decoct. cort. com. the taste was bitterer, and the precipitation much more copious. The two decoctions differed in every respect, much more than the two infusions. The resinous matter was so copiously deposited on the sides of the vessel that contained this decoction, that it resembled very much saline crystallizations.

WITH PROOF SPIRIT.

Exp. 3. One ounce of the same bark, in powder, was infused in eight ounces of proof spirit for fourteen days, the vessel being frequently shaken. It was then found of a beautiful dark brown colour, inclining to red, and had a pleasant bitter astringent taste. With water it exhibited the same appearance as the common tincture.

WITH ACIDS.

Exp. 4. One scruple of the red bark in powder, was infused in spt. vitriol. ten. ℥i . for the space of twenty-four hours. The result was similar to the same experiment
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with

with common bark, except that the liquor was a little more tinged with red.

Exp. 5. One scruple of the same bark was infused in aq. fort. dup. ℥i . In twenty-four hours this experiment exhibited the same phænomena as described in Exp. 4. with common bark, except that the colour inclined more to red.

Exp. 6. One ounce of spt. sal. marin. added to one scruple of the powder of red bark, in twenty-four hours produced a tincture of a reddish brown colour; but on the addition of water, no taste of the bark was perceived, and with alkali, only a very slight bitter taste was produced.

Exp. 7. One ounce of acetum distill. in twenty-fours appeared to have had no effect on one scruple of the powder of red bark.

WITH ALKALIES.

Exp. 8. One scruple of the red bark, with the same quantity of vegetable alkali, was infused in one ounce of water. In twenty-four hours the liquor had acquired but a slight red colour, had no taste of the bark when diluted with water, and on the addition

of acid manifested but a very slight bitter taste.

Exp. 9. One scruple of the same bark was infused in an ounce of water, with a scruple of fossil alkali. The colour of the infusion was a little deeper, but other circumstances as in the 9th Exp. described under the section of quilled bark.

Exp. 10. One ounce of spt. corn. cerv. was added to one scruple of the red bark. The pellicle, precipitation, and other circumstances, differed only in colour from the same Exp. with common bark.

Exp. 11. To one scruple of the red bark in powder, was added one ounce of spt. fal. ammon. c. calce. In twenty-four hours the colour was a beautiful red brown. A precipitation appeared to have taken place on the sides of the vessel. Dilution with water produced no taste of the bark, but the addition of alkali produced a precipitation of a bitter taste.

WITH NEUTRAL SALTS.

Exp. 12. Of the red Peruvian bark and nitre, each one scruple, were infused in one ounce of water for twenty-four hours. The
liquor

liquor was scarcely discoloured, and had no taste of the cortex.

Exp. 13. One scruple of the same bark, with a scruple of cream of tartar, was infused in one ounce of water for twenty-four hours; the liquor was transparent, and had a very slight bitter taste. The addition of a few drops of tinct. mart. produced but a very slight blackish tinge.

EXPERIMENTS ON THE SIMPLE INFUSION OF RED BARK.

Exp. 14. To two ounces of the infusion prepared as in Exp. 1. were added gtt. x. of the tinct. martial. The blackness was at first slight, considerably inferior to the same experiment with the infusion of the quilled, and the precipitate by no means so copious*.

* This experiment was repeated in the presence of several chemists, and when compared with the same experiment on the common infusion, it was unanimously agreed that this mixture was considerably the blackest. Dr. Saunders has drawn a different conclusion, but a repetition of this experiment will readily convince any unprejudiced person; and if intensity of blackness is any proof of superiority in astringency, we have in this experiment, a decisive proof of the superior astringency of the quilled bark.

Exp. 15. To two ounces of the same infusion, were added spt. vitriol. ten. gtt. xx. The liquor was rendered turbid, let fall a more copious precipitation, and disguised the acid taste more than in the same experiment with the quilled species.

EXPERIMENTS ON THE DECOCTION OF RED BARK.

Exp. 16. To two ounces of the decoction of red bark, were added gtt. x. of the tinct. martial. A purple colour was produced, very different from the inky blackness in the preceding experiments, and the liquor continued long without letting fall any precipitate. After standing twenty-four hours, it scarcely could be said to be of a black colour*; and

* It is to be wished, that Dr. Saunders had given us an experiment of this kind: it is one which manifests at once the superior astringency of the common bark, and explains the nature of the astringent principle. The decoction abounds more in resin than the infusion, yet on the addition of chalybeates it manifests less astringency. The conclusion is plain, the resin is not the astringent, but the bitter principle. Dr. Saunders indeed, is not the first author who has mistaken this matter. The ingenious
Dr.

and the difference was more striking betwixt the two species of cortex in this, than in any other experiment before described.

Exp. 17. To two ounces of the decoction were added gtt. xx. of spt. vitriol. ten. The acid taste was more disguised, and the precipitation considerably more copious than in the same experiment with common bark.

Dr. Lewis says, "The astringency of the cortex resides wholly in its resin, which is not soluble in watery liquors." Neumann's Chem. p. 339, Note.

Dr. Percival long ago detected this error; and we cannot help being rather surprised, that Dr. Saunders should not have been acquainted with this discovery, as he speaks of the Doctor in terms of respect due to so accurate a writer, and has taken the 8th Exp. from his works.

We shall here subjoin two experiments, which prove, beyond a doubt, the truth of the remark that the gum is the astringent principle.

Exp. 1. One scruple of the watery extract, was dissolved in one ounce of distilled water. To the mixture were added gtt. v. of the tinct. martial. The liquor immediately became of an inky black colour, greatly superior to that produced by the following,

Exp. 2. One scruple of the resinous extract of bark, was dissolved in one ounce of rectified spirit. To the mixture were added gtt. v. of the tinct. flor. martial. A black colour was produced, but greatly inferior to that produced by the preceding experiment.

EXPERIMENTS ON THE SPIRITUOUS TINCTURE OF RED BARK.

Exp. 18. To one ounce of the tincture, were added gtt. x. of the tinct. martial. The whole became soon of a deep black colour.

Exp. 19. To one ounce of the same tincture, were added gtt. xx. of spt. vitriol. ten. The mixture was rendered turbid: the acid taste scarcely perceptible, and a copious precipitation let fall.

MISCELLANEOUS EXPERIMENTS.

Exp. 20. Four pounds of the best red bark, reduced to coarse powder, were digested with four gallons of rectified spirit, for twenty-four hours, as described under the 20th Exp. with common bark. By evaporation, *twelve* ounces of refinous extract were obtained.

Exp. 21. One pound of the best red bark was boiled in two gallons of water. The liquor strained and evaporated to the common pilular consistence, yielded five ounces and half a dram of gummy extract.

Exp. 22. One dram of lean raw beef, was put into a phial containing two ounces of the
infu-

infusion of red bark, prepared as in Exp. 1. After having stood forty-eight hours in a window, exposed to a south-west aspect, in the month of August, it began to emit bubbles of air, and manifest signs of putrescency; in three hours more it began to smell offensively, the liquor lost its transparency, and in six hours more the meat was perfectly corrupt. —The same quantity of beef, kept as a standard in two ounces of water, was putrid in thirty-six hours.

Exp. 23. Half an ounce of red bark in powder, was infused in four ounces of red port wine. In four days the colour of the liquor appeared the same as at first. The taste was agreeably bitter, and chalybeates rendered the infusion black.

Exp. 24. Half an ounce of red bark in powder, was infused in four ounces of white port wine. In four days the colour inclined to a beautiful red. The liquor had an agreeable bitter taste, and manifested considerable astringency on the addition of chalybeates.

C H A P III.

*Conclusions from the Experiments on the Cortex
Ruber, or Red Peruvian Bark.*

THE same general conclusions may be drawn respecting the nature and properties of the red bark, as we have before attempted on the *cinchona officinalis*. We shall not therefore repeat what we have said in a foregoing chapter, but confine ourselves chiefly to a comparative view of the virtues of each.

Every experiment that we have related, tends to shew the analogy betwixt the two species. We find the red bark, 1. An astringent. 2. A bitter, and 3. An antiseptic.

As these experiments were made conjointly with those on the common bark, we were able to attend minutely to every circumstance which could mark a difference; and we found that the latter manifested greater signs of astringency, and yielded more watery, or gummy extract, whilst the red species abounded

abounded more in resin, and yielded a more copious spirituous extract.

To ascertain the exact quantity which each species yields per pound, will scarcely appear a matter of much importance, as different specimens yield different quantities, according to the quality of the bark.

M. Boulduc obtained from a pound of bark only five drams and a scruple of spirituous extract. Neumann tells us, that “ a
 “ pound yielded, with rectified spirit, ten
 “ drams and two scruples of resinous ; and
 “ afterwards, with water, five drams of
 “ gummy extract. On applying water at
 “ first, says he, I obtained seven drams and
 “ a scruple of gummy, and afterwards, by
 “ spirit, six drams of resinous extract.”
 “ Neumann’s Chemistry, p. 90.

Dr. Lewis tells us, that he obtained a much larger proportion of resinous extract than what Neumann mentions.

According to our experiments, the quilled bark invariably yields more gummy or watery extract than the red, and the latter more spirituous or resinous extract. To ascertain the specific quantity of each is a matter of no importance ; we have given the result of our
 enqui-

enquiries, under the separate chapter of experiments; and for the benefit of a ready comparison, shall subjoin a view of the separate quantities,

Four pounds of red bark, yield of spirituous
extract, twelve ounces.

Ditto of quilled bark, eight ounces.

One pound of quilled bark, yields of watery
extract, five ounces, two drams,
ʒij. and seven grains.

Ditto of red bark, five ounces and
half a dram.

We are sorry to be obliged to differ from Dr. Saunders and his friends, on several questions relative to the red bark. Though we believe the reputation of this, or any other medicine is very little concerned by any opinions respecting its antiseptic virtues, yet, as some persons may be disposed to attribute much to this supposed quality, it will be necessary to observe here, that our experiments prove the red bark to be a very weak antiseptic, considerably inferior to the quilled bark, and not equal to the *Cinchona Sanctæ Luccæ*, whose powers of preventing putrefaction, in dead animal substances, are but weak.

These

These are the conclusions which chemical investigation tends to establish, and a slight comparison will shew how greatly they militate against Dr. Saunders's opinion; but it is not our wish to contrast the results of experiments upon which accuracy and chemical knowledge must decide. When truth is opposed to error, no authority can resist enquiry, and no power prevent detection; but it would be base, it would be ungenerous to pursue discovery to the detraction of merit. The brightest incident in the character of Hippocrates was, that he confessed his own errors. May every modern physician possess the candour of the father of physic, and not be ashamed to acknowledge a mistake into which inattention may have hurried him! From such conduct can we alone expect unanimity and improvement in science. Great minds are above mean actions; and great geniusses superior to illiberal criticisms. A man may have hands to discover inaccuracies, without a head capable of the thought that produced them. Mistake is sometimes the result of exuberant genius, at others the effect of an heated imagination, which misleads the judgment. Cool experience corrects these fallies
of

of the mind; and we are surprised to find opinion change with time. Physicians have not been proof against this fluctility of thought; and even medicine, with all her affected wisdom, bows the slave of fashion.

The bark has long been a fashionable remedy, but the red bark has lately been the *ton*; and we believe it requires nothing more than the sanction of a great name, to bring the Caribbæan bark into vogue; but if the period of its aggrandization should ever arise, we trust its pretensions will be better founded than those of the red bark.

C H A P. IV.

On the Medical Effects of the Red Bark.

THE number of respectable names that are subjoined to Dr. Saunders's publication, makes me proceed with extreme caution to deliver my sentiments on this part of my subject: I am not however without my authority, and names very respectful grace my opinion. Lest I should be misunderstood, I think it necessary here to pre-
mise,

mise, that I am not writing against the red bark, or denying the many facts that have given rise to its reputation in one part of this island. I have already endeavoured to shew, that its principles have been mistaken; and as its use has been indiscriminate, no wonder that we should have diversities of opinion. I am willing to allow that it may be preferable to the quilled, in some instances, though not as Dr. Saunders supposed by its superior astringency, but rather on account of its bitterness. In what cases this may give it the preference, is not easy to determine. There are agues which astringents alone, as alum, effectually cure: there are others in which bitters alone, as camomile flowers, absinthium, or gentian, are the sole remedies: in others again, and those most frequent, the conjunction of these principles is necessary. Others yield not to any of these powers, but require the most diffusible stimuli. To explain this curious fact may be difficult, probably past the power of art. I will here hazard a question,—does it not arise from a peculiar modification of debility?

Not willing to admit the universal superiority of the red bark, I will mention a few names,
and

and from them a few cases, in which the quilled proved preferable. My medical friends at Edinburgh, were never able to give assent to the *eclat* which the red bark had gained. My friend, Dr. Black, whose name I cannot mention without the most profound respect, informed me of a very singular case, which happened in the practice of a surgeon of considerable eminence in Edinburgh. A person had been some time afflicted with an ulcer, which discharged a foetid, ill-conditioned pus; he was put under the use of bark, the discharge lessened, and the pus improved. The surgeon happening to get some red bark, the patient was ordered to use it. The wound grew gradually worse, the common bark was had recourse to, and every favourable symptom returned with its use.

The physicians to the royal infirmary at Edinburgh, have now nearly laid aside the use of the red bark. Dr. Hamilton, from whose friendship and judicious practice during three years attendance at the hospital I received great improvement, found the red bark totally inefficacious in the tertians and quartans of last spring. The same thing happened under the practice of Dr. Henry Cullen, and I could bring
several

several practitioners to vouch the same in England. The following case was given me by a London practitioner. "A lady seven months advanced in pregnancy, was seized with an intermittent of the tertian type, and by the advice of her physician took two ounces of the powder of red bark in the course of twenty-four hours. She continued it in large doses for a week, without any effect on the complaint, though it did not purge her. The common bark was had recourse to, and cured the disorder."

We have been told, that the red bark produces wonderful effects on the Continent; but Dr. Sandifort, professor of anatomy at Leyden, informed me, when I visited that place in July last, that he never could find out its efficacy, and now never prescribes it. Holland is the country where agues are endemial; and no doubt the practice and observation of a man of Dr. Sandifort's reputation, must have weight with the impartial public. The physicians at Haerlem (if I am not mistaken) informed me to the same effect. But I met with such unexpected politeness from Dr. Van-Maurum, professor of natural philosophy, and keeper of the cabinet of

natural history, that my time was so much taken up in viewing the curiosities of nature and of art, that I forgot for a while the state of medicine. The authority which I have adduced, may plead apology for my apparent scepticism. To depreciate a medicine is not a pleasant office, but to prevent mistaken judgment, correct false opinions, and vindicate the character of an useful medicine, is an employment worthy the pen of every honest physician. The quilled bark appears to me to be unjustly losing ground. When genuine, and in good order, I shall always prefer it as a powerful, grateful, warm astringent. Those who think differently, have a right to act differently. Prescription is a field of liberty, on which every physician may ride his hobby-horse, provided he splashes not his neighbour or the sick, and most undoubtedly he who chuses may ride in red.

SECTION

SECTION III.

ON THE CINCHONA SANCTÆ LUCIÆ,
QUINQUINA-PITON, QUINQUINA DE LA
MARTINIQUE, CARIBBÆAN, OR NEW-
BARK.

C H A P. I.

The History of the Cinchona Sanctæ Luciæ.

IN the month of November 1783, when I was pursuing my medical studies in London, I first met with a specimen of this bark. Mr. Wilson, an ingenious apothecary in Henrietta-street Covent-Garden, communicated some specimens and an account of this vegetable, to a medical society held in Mr. Sheldon's theatre, Great Queen-street, Lincoln's-Inn-Fields. From the account delivered to the society, and from an examination of the fruit of the plant, which was pretty well preserved, there was no doubt but it belonged to the genus cinchona. Most of the eminent botanists in London are agreed

upon this point ; and my learned friend and preceptor, Dr. Hope, professor of botany in the university of Edinburgh, who has had an opportunity of examining this species, informs me, that he is of the same opinion. The colour of this bark is a dark brown, the pieces are of various sizes, some small and thin, rolled up like cinnamon, or the quilled bark : others of a larger kind. Some are covered with a white silver-coloured cuticle : others are externally of a much darker colour. When broke, it has a fibrous texture. Its taste is at first astringent, slightly aromatic ; but when it has remained some time in the mouth, exceedingly bitter, resembling the bitterness of gentian. Its botanical character is thus defined : *Cinchona*. *Floribus cymosis Sanctæ Luciae calyx quinquefidus*. *Corolla monopetala, infundibuliformis, laciniis linearibus*. *Pistillum capitatum*. *Antheræ lineares*. *Semina multa, alata*. *Capsula biloculari ovali, striata*. *Folia oblonga, disticha*. *Habitat inter nemora, locis umbrosis, præcipuè ripa alicujus rivi*.

We have likewise been favoured with the whole account of this vegetable from Mr. Wilson, as received from Mr. Davidson, surgeon

geon in St. Lucia ; and as the paper is prepared for publication in the Philosophical Transactions, we shall not venture to transcribe it, but beg leave only to present our readers with the following extract.

“ The bark-tree of this island is nearly
 “ about the size of a cherry-tree, seldom
 “ thicker than the thigh, tolerably straight,
 “ the wood light and porous, without any
 “ of the bitterness or astringency of the bark
 “ itself. It delights in a shady situation, the
 “ north-west aspect of hills, under larger
 “ trees, and is generally to be found about
 “ the middle of a hill, near some running
 “ water. The leaves are large, oblong,
 “ opposite, and plain, preserving as well as
 “ the flowers and seeds the bitter taste of
 “ the bark.

“ In the beginning of the rainy season
 “ (June) the tree puts forth its flowers in
 “ small tufts. At first they are white, but
 “ afterwards they turn purplish. The sta-
 “ mina are five in number, with a single
 “ style. The germen oblong, bilocular,
 “ furrowed on each side. It bursts when
 “ dry, and sheds its two seeds, which are
 “ covered with a feathery down. The ger-

“ men in the bark of our island of St. Lucia,
 “ appears to be larger than that growing at
 “ Tobago, if I may judge from a drawing
 “ which I have seen. The other botanical
 “ characters correspond. The soil in general
 “ where our bark grows, is a stiff red clay.”

This is all I am able to give of the natural history of the *Cinchona Sanctæ Luciae*; but though we are so little acquainted with it, the French appear to have paid attention to it some time ago. M. de Badier, an inhabitant of the island of Guadeloupe, was the first person who sent to France an account of the bark-tree of Martinique, which in that island is known under the name of quinquina-piton. He carried some specimens of it into France, and gave them to some eminent botanists and chemists, who severally made their observations on the nature and qualities of this article. M. de Badier likewise communicated some important observations on the medical virtues of this bark, from which it appeared, that the surgeons and inhabitants had found it peculiarly beneficial in the bad fevers which rage in those climates. M. Descemet, a distinguished botanist, undertook to examine and compare the

the genus of this plant, with the description of the common Peruvian bark ; and in a memoir which he gave to the faculty of medicine, he proved the identity of the genus. His description of the fruit of this vegetable, agrees so perfectly with that given by M. de la Condamine, of the fruit of the quinquina du Perou, that it is impossible, adds he, to find any difference. In both, the calyx is *sur le fruit* ; and, as Tournefort says, the calyx becomes the fruit. In both the fruit is oval ; it opens into two half pods, separated by a partition, and lined with a yellow pellicle, smooth and slender, and which appears to be a prolongation of the partition. In both the seeds are flattened and turned backwards. They are both about half a line in diameter, are very slender towards the ends, and thick in the middle, which is of a brown colour, and contains the seed within its thickness betwixt two pellicles. The seeds which M. de la Condamine has compared with those of the elm, are attached and disposed in the manner of scales, on an oblong placenta, pointed at one end, and obtuse at the other. This placenta is fastened on each side to the small partition. Many

other circumstances are similar, and corroborate the opinion of their being of the same genus. In both, the leaves are opposite; and as M. Descemet had an opportunity of examining a living species of the *cinchona officinalis* in the king of France's garden, he has received every confirmation that he could wish of his assertion.

In the *Histoire des Maladies de Saint Domingue*, Tom. II. pag. 231. we find a letter from M. Poupel Desportes, king's physician in that colony, and correspondent member of the *Academie des Sciences*, to his brother, written in the year 1747; in which he observes, that he had long ago given an account to M. de Jussieu, of three species of bark, growing at St. Domingo, a description of one of which agreed perfectly with that sent from Perou by M. de la Condamine. M. Desportes has named this species "*Trachelium arborescens & fluviatile laurifolius conjugatis floribus racemosis, seu corymbosis albis capsulis conicis nigris.*" There is no doubt that this vegetable, which is here called *trachelium*, is of the genus of *cinchona*, and the same with what we are describing. M. de la Planche, a gentleman
well

well known for his accuracy in chemical experiments, has given an analysis of the quinquina-piton, which serves to prove the good opinion we have formed of it, and points out the analogy betwixt it, and the common species of Peruvian bark. M. Mallet, Docteur Regent de la Faculté de Medecine, published in the “Memoires de la Seance publique de la Faculté de Medecine,” a memoir sur le quinquina de la Martinique, connu sous le nom de quinquina-piton, an account of which is given in the Journal de Physique Mars 1781 (tom. xvii.) The author there observes, that the quinquina-piton “est large, “ mince, fibreuse, legere ; depouillee de son “ epiderme, d’un gris brun fonce, d’une “ Saveur *excessivement amere*.” A character which corresponds exactly with what we have observed of the cinchona Sanctæ Lucæ. We cannot therefore any longer doubt the identity of this species of bark, with that described by the French writers ; but must think it very extraordinary, that France should so long have enjoyed a valuable remedy, with which we have been hitherto unacquainted. That we may recommend it more particularly to the attention of our countrymen,

countrymen, we shall venture to present the reader with a series of experiments on this subject, observing nearly the same order that we have done in the preceding sections; and we are happy to find, that chemical analysis corroborates the opinion we have formed.

C H A P. II.

Experiments on the Cinchona Sanctæ Luciae, or Caribbæan Bark.

Exp. 1. **T**WO drams of the Caribbæan bark, were infused for twenty-four hours in four ounces of distilled water. The infusion was of a dark brown colour, and had a very bitter taste like the flavour of gentian.

Exp. 2. Two drams of the same bark reduced to coarse powder, were boiled in eight ounces of pure water to four. The liquor was passed through a linen cloth, and set by to cool. It had a brown appearance, more inclining to red or chocolate colour than the infusion, and let fall an exceeding copious precipitation in cooling, resembling saline crys-

crystallizations, and much more copious than those described in Exp. 2. with red bark. The taste was more nauseously bitter than the infusion.

WITH PROOF SPIRIT.

Exp. 3. One dram of the same bark in coarse powder, was infused in two ounces of proof spirit for twelve days. The tincture resembled very much in appearance the common tincture of bark*. Its taste was much more agreeable, than either the infusion or decoction.

WITH ACIDS.

Exp. 4. To one scruple of the same bark, was added one ounce of spt. vitriol. ten. The colour in twenty-four hours was rather deeper, but every other circumstance nearly the same as in Exp. 4. with common bark.

* “ L’esprit de vin agit puissamment sur les deux especes
 “ de quinquina.—La teinture du quinquina-piton est
 “ plus amere, plus foncée en couleur, se trouble d’elle même
 “ au bout de deux jours : ce qui n’arrive plus, lorsqu’elle
 “ a été filtrée. Elle se mele intimement a l’eau sans per-
 “ dre sa nouvelle transparence, and laisse plus que *le quart*
 “ de son poids d’un extrait d’un brun noir luisant, tenace,
 “ presque d’une faveur d’aloës.” M. Mallet.

Exp.

Exp. 5. One scruple of the same in powder, was infused in one ounce of aq. fort. dup. which dissolved this vegetable in the same manner as it did the two former species *.

Exp. 6. One ounce of spt. sal. marin. was added to one scruple of the same powdered bark. In twenty-four hours it was rather of a darker colour, and not so transparent as in the sixth experiment, with the common bark.

Exp. 7. One scruple of the same powdered bark, was infused in one ounce of acetum distill. which acquired little colour in twenty-four hours, but in three days had a bitter taste, probably owing to the evapora-

* “ L’acide nitreux attaque rapidement les substances
 “ vegetales, & particulièrement nos deux especes de quina-
 “ quina. Nous avons mis une egale quantité de ces
 “ deux ecorces a digerer dans cet acide : les deux solutions
 “ ont laissé, apres l’evaporation de toute l’humidité, un
 “ residu jaune léger, spongieux fort acide, animant un
 “ peu d’activité du feu, mais n’y’ exerçant pas la fulgura-
 “ tion qui caractérise les sels nitreux. Les residus, lavés
 “ à l’eau fraîche jusqu’à perte de toute acidité, se trouve-
 “ rent depouillés de saveur & de principe, entierement
 “ épuisés : & c’est en vain qu’on a cherché de l’alkali
 “ fixe apres l’incineration. Enfin les deux especes de
 “ quinquina, mises en’ digestion, dans de la liqueur alka-
 “ line ont donné deux teintures rouges tres limpides.” Ibid.

tion

tion of part of the acid, as the mixture was exposed to the air.

WITH ALKALIES.

Exp. 8. One scruple of the same bark, with the same quantity of vegetable fixed alkali, was infused in one ounce of water. The colour was darker, but other circumstances, similar to Exp. 8. of the preceding sections.

Exp. 9. To one scruple of the same bark, were added one scruple of fossil alkali, and one ounce of water. In twenty-four hours the liquor was of a dark brown colour, had no taste of the bark, but on the addition of acid a bitter taste was produced.

Exp. 10. One scruple of the same bark, infused for twenty-four hours, in one ounce of spt. corn. cervi. exhibited the same appearances as the same experiment with common and red bark. The colour was rather darker, but on the addition of acid, scarcely any bitter taste could be discerned.

Exp. 11. One ounce of spt. sal. ammon. c. calce. was added to one scruple of the same powdered bark. In twenty-four hours the colour was a dark brown, and on the addition
of

of acid, the liquor was rendered turbid, and a copious precipitation, with a bitter taste, produced.

WITH NEUTRAL SALTS.

Exp. 12. To one scruple of the same powdered bark, were added one scruple of nitre, and an ounce of water. In twenty-four hours the colour of the infusion was much superior to the same experiment with common bark; and what appeared rather extraordinary was, that the surface of the liquor, in three days, became very mouldy, though it had continued in the same place with the other experiments, which were not affected in the same manner.

Exp. 13. One scruple of the same bark, infused with the same quantity of cream of tartar, in one ounce of water, for twenty-four hours, appeared to have yielded none of its virtues to the infusion.

EXPERIMENTS ON THE SIMPLE INFUSION OF CARIBBÆAN BARK.

Exp. 14. To two ounces of the infusion, prepared as in Exp. 2. were added gtt. x. of the tinct. martial. An intense black colour was immediately produced, much superior to the
same

same experiment with either of the other species; and on standing, the precipitation was very copious.

Exp. 15. To two ounces of the infusion, were added gtt. xx. of spt. vitriol. ten. The liquor was immediately rendered turbid, became of a lighter yellow colour, let fall a copious precipitation, and was of a less acid taste than the same experiment with either of the other species.

* EXPERIMENTS ON THE DECOCTION OF
CARIBBÆEN BARK.

Exp. 16. To two ounces of the decoction, were added gtt. x. of the tinct. martial. A black colour was produced, but much inferior to the same experiment with the infusion.

* “ La grande amertume du quinquina-piton masquant
 “ les autres qualités sapides, pour decider s’il possèdoit,
 “ aussi bien que le quinquina du Perou, quelque principe
 “ astringent, nous les avons fait bouillir l’un, & l’autre
 “ dans l’eau non epurée de passy, qui a noirci sur le champ.
 “ Nous les avons fait bouillir ensuite dans du vin rouge,
 “ dont ils ont precipité entierement la partie colorante, &
 “ n’ont laissé chacun que la couleur, & la saveur qui leur
 “ sont particulieres; mais nous avons observé que le
 “ quinquina-piton decomposoit promptement a froid le vin
 “ rouge: ceque ne fait que tres lentement le quinquina
 “ du Perou.” M. Mallet.

Exp.

Exp. 17. To two ounces of the decoction, were added of spt. vitriol. ten. gtt. xx. The colour of the liquor was immediately changed to a light brown, and a copious precipitation was produced, which in a short time hardened into pieces of resin, which were not again soluble in the same mixture, even by shaking the phial.

EXPERIMENTS ON THE SPIRITUOUS TINCTURE OF THE CARIBBÆAN BARK.

Exp. 18. To half an ounce of the tincture, prepared as in Exp. 3. were added gtt. v. of the tinct. martial. The black colour produced, was intense, and the precipitation copious.

Exp. 19. To half an ounce of the tincture, were added spt. vitriol. ten. gtt. v. The whole became turbid, and the acid taste was scarcely perceptible.

MISCELLANEOUS EXPERIMENTS.

Exp. 20. Half a pound of the cinchona Sanctæ Luciae, boiled in four gallons of water, filtered and evaporated to pilular consistence, yielded four ounces of extract.

Exp. 21. One dram of lean raw beef, was suspended in two ounces of the infusion, as
pre-

prepared in Exp. 1. being placed in a window, exposed to a south-west aspect, in fifty hours it began to emit bubbles of air, and manifest signs of putrescency, running through the different stages of putrefaction in about six hours later than the same experiment with red bark.

Exp. 22. Half an ounce of the *Cinchona Sanctæ Luciae* in powder, was infused in four ounces of red port wine; in four days the liquor had acquired a strong bitter taste, was of a beautiful dark reddish brown colour, and manifested great signs of astringency on the addition of chalybeates.

Exp. 23. Half an ounce of the *Cinchona Sanctæ Luciae* in powder, was infused in four ounces of white port wine. In four days the colour was dark brown, but the taste vastly inferior to the former infusion.

Exp. 24. One dram of the *Cinchona Sanctæ Luciae* in powder, was infused in two ounces of rectified spirit of wine. In five days the tincture had acquired a dark brown colour, manifested signs of great astringency on the addition of chalybeates, had a pleasant agreeable taste, mixed uniformly with water, forming an opaque, light-coloured mixture, which let fall a very slight precipitate.

C H A P. III.

Conclusions from the Experiments on the Cinchona Sanctæ Lucæ.

WE have hitherto been examining the union of two powerful principles, and investigation here points out to us a combination of active parts, greatly superior to what we have before discovered.

The general conclusions which we have deduced from our experiments in the preceding sections, are equally applicable to the present species of cinchona, which we have demonstrated to be

1. A most powerful astringent.
2. An excessive bitter.
3. An antiseptic.

On comparison, we find its astringency and bitterness greatly superior to the other species of the bark; and as these are the only active principles that we have been able to detect in the cinchona, we may conclude this species to be possessed of the virtues of the other in a concentered form. Medical
experience

experience confirms this opinion, and we find it producing all the good effects of the bark in a small dose; but at present we speak not of its exhibition in disease. M. Mallet, to whose paper we are under many obligations, has favoured us with some conclusions from his own experiments on this subject, with which we shall beg leave to present the reader. The substance of them is as follows*.

I. Water

* For the amusement of the French reader, we shall subjoin M. Mallet's own words.—“Voici, ce que nous pouvons conclure de cette analyse.

“1. L'eau suffit pour extraire les principes des deux
 “espèces de quinquina, mais à froid, ou aidée de différens
 “degrés de chaleur, son action, & même celle du vin est
 “plus prompte, & plus marquée sur le quinquina-piton
 “que sur l'autre. Il y a cependant, dans le quinquina du
 “Perou, un principe que l'eau ne peut dissoudre, qui
 “trouble l'infusion, & la décoction ou il paroît errant, &
 “qui fait une espèce de lait virginal, grisâtre de la teinture
 “spiritueuse étendue dans l'eau, mais quel est ce prin-
 “cipe? le trouble de l'infusion plus marqué, dans la de-
 “coction de ce même quinquina du Perou, la difficulté
 “que ces liqueurs éprouvent à traverser les filtres, la
 “limpidité qui leur est procurée par l'addition de l'alkali
 “fixe, ou de l'esprit de vin, cette même limpidité qui est
 “constante dans la teinture spiritueuse ou alkaline, tout
 “prouve qu'il est de nature résineuse. Dans le quin-

1. Water is sufficient to extract the active principles of both species of bark, but whether cold, or aided by different degrees of heat, its action, and even that of wine, is

“ quina-piton, au contraire, tout est soluble dans l'eau ;
 “ l'esprit de vin y trouve un principe qu'il ne peut dis-
 “ soudre, il le depose au bout de deux jours : c'est ce qui
 “ est cause que sa teinture spiritueuse se trouble alors :
 “ mais ce principe surabonde en petite quantité, & paroît
 “ etre de nature gommeuse.

“ 2. Il existe evidemment, dans l'un & dans l'autre,
 “ un principe astringent, qui n'est nullement dû a l'epi-
 “ derme † mais qui appartient en entier a l'ecorce propre-
 “ ment dite, ou il reside.

“ 3. Les deux quinquina ont une odeur de moisi, qui
 “ n'est pas desagréable, qui leur est propre. Mais ce n'est
 “ pas un principe aromatique : on n'y trouve de principe
 “ ni salin, ni ferrugineux : ce qui le constitue essentiel-
 “ lement est un extrait savonneux, astringent, amer, pres-
 “ de moitié plus abondant dans le quinquina-piton que
 “ dans le quinquina du Perou. Ces deux especes sont
 “ donc de même nature mais avec cette difference, que
 “ la resine est surajoutée a la partie savonneuse dans le
 “ quinquina du Perou : & que dans le quinquina-piton
 “ au contraire s'il y'existe un peu de gomme à nud les
 “ principes d'ailleurs y'sont dans un etat de combinaison
 “ plus exact, & y'forment un corps savonneux plus abon-
 “ dant, & plus parfait.” Vid. Journal de Physique, ut
 supra.

† La decoction de l'epiderme du quinquina du Perou ne fait pas
 de l'encre avec les eaux de Passy.

quicker, and more effectual on the quinquina-piton, than on the other. There is nevertheless, in the Peruvian bark, a principle which does not dissolve in water, which disturbs the transparency of the infusion and decoction, where it appears in too great plenty, and makes a kind of milk (*lait virginal*) of a greyish colour, when the spirituous tincture is mixed with water. But what is this principle? The muddiness of the infusion, and the greater want of transparency in the decoction of the Peruvian bark itself, the difficulty which these liquors have in passing through the filtre, the transparency which is occasioned in them by the addition of fixed alkali or spirits of wine, and this transparency itself, which is constant in the spirituous or alkaline tincture, all prove that it is of a resinous nature.

In the quinquina-piton, on the contrary, all is soluble in water: there is in it a principle which spirit of wine cannot dissolve, but which it deposits in about two days: this is the reason why the spirituous tincture lets fall a precipitate. But this principle superabounds in a small quantity, and appears to be of a gummy nature.

2. There exists evidently in both species, an astringent principle, which does not belong to the outer rind, but is lodged in what may properly be called the whole substance of the bark.

3. The two species of quinquina have a mouldy smell, which is not disagreeable, and which is peculiar to them, but it is not an aromatic principle: we could not discover a saline or ferruginous principle: the constituent essential principle is a saponaceous extract, astringent, bitter, and more abundant very near by one half in the quinquina-piton, than in the Peruvian bark.

These two species are then of the same nature, but with this difference, that the resin is over-added to the saponaceous part in the Peruvian bark; and that in the quinquina-piton, on the contrary, there exists a small portion of gum, separate from the other principles, which are there in a state of more exact combination, and form in it a saponaceous body, more abundant and more perfect.

Such are the conclusions which M. Mallet has deduced from his experiments, to which we are inclined to give all due praise, but
cannot

cannot entirely agree with the learned professor. He seems to suppose the gum a principle distinct from the saponaceous part: we believe the latter, or what he calls the saponaceous part, to be nothing more than the astringent gum, which assists the solution of the resin in water, in the same manner as gum arabic does when added to the decoction. Our experiments lead us to agree with him when he asserts, that there exists more gum in the *Cinchona Sanctæ Luciae* than in the common bark; but we have no reason to conclude, that it exists separately from the resin; on the contrary, it appears to be thoroughly conjoined with it, from the great bitterness of the infusion.

In regard to M. Mallet's opinion respecting the aromatic principle, we perfectly assent to it, and believe that no such part exists; as we were never able to detect any thing of the kind by distillation, or other chemical process.

The medical powers of the bark seem to reside in the gum and resin; nor will it appear at all surprising, that such powerful effects result from this combination. The chemical analysis of opium discovers no aro-

matic oil, yet we find it the most effectual stimulant in nature:

Independent of the analogy drawn from the chemical qualities of these two potent remedies, such as each containing an astringent gum and bitter resin, we shall find their medical effects in many respects alike. Much has been written concerning the sedative effects of opium, but late experiments* prove it beyond a doubt stimulant; and those who understand the doctrine of direct and indirect debility, will have no difficulty in explaining, on the most philosophical principles, its action in producing sleep. Large doses of bark frequently produce drowsiness, and in some instances sleep, as we have often had opportunities of observing; but we cannot at present enter into this enquiry: as an antiseptic, this bark is superior to the red, but inferior to the common.

* Vid. Harrison's Thes. Inaug. de Opio,

C H A P. IV.

*On the Medical Effects of the Cinchona Sanctæ
Luciæ, or Caribbæan Bark.*

HAVING, from experiment, acquired some knowledge of the constituent parts of this new species of bark, we shall proceed to treat of its effects in medicine. Our analysis confirms the opinion which we endeavoured to establish; and we have no doubt but the bark of St. Lucia is the same as that described by the French writers. The accounts from Martinique, and Guadeloupe, with the labours of M. Mallet, corroborate this idea.

We have found this bark more abundant than either of the former species in astringent gum and bitter resin; and from this knowledge, we shall not be surprised to find it a very active remedy, in all those diseases which require the use of the cinchona. On this subject we shall not content ourselves with a mere detail of our own experience. M. Mallet informs us, that he tried it in eleven cases, ten of which were tertian fevers, which had
con-

continued for a longer or shorter time; one was of a month, others of two, three, four, or even twelve months standing; all had been treated in the ordinary method, and resisted the use of common Peruvian bark. The eleventh case was a quartan of eight months continuance, in which the common bark had likewise been tried without effect.

In the first three, he prescribed a decoction prepared from two drams of the quinquina-piton, to an English pint of water*, of which the patient took three cupfuls † every hour, which vomited, and purged them all two or three times; but the next day the paroxysms were very short and slight, without any cold fit. In these three cases, M. Mallet could not persuade the patients to repeat the dose, they had conceived such an aversion to the excessive bitterness. He then gave the same bark, to the quantity of a dram in powder, mixed with the syrup of marshmallows, but it produced vomitings and purgings. The next day, however, the paroxysms were scarcely perceptible, but the sick refused to continue the

* Deux gros de quinquina-piton en decoction dans une chopine d'eau.

† Je leur fis prendre en trois verres.

medicine. M. Solier tried this remedy conjointly with M. Mallet, in four other cases; the bolus was used, it prevented the return of a quartan for eight days, but the patient, in this instance, also refused the medicine. In the month of November, 1779, M. Mallet again tried the quinquina-piton, in the quantity of a dram, in the form of bolus, to a young man about eighteen or twenty years of age, who had laboured for a month under a tertian fever, which had resisted the ordinary treatment. On the very first dose the fever ceased entirely, he had no cold fit, and only a slight accession, which terminated in a sweat. He took the same bolus two days afterwards, and had not the slightest return of the complaint. The medicine was omitted, and the patient continued well. M. Mallet advised eight grains of the powder to be taken every day, for a short time. This small dose kept the patient sufficiently open, and he continued well. On the first of December, the same industrious professor, gave the quinquina-piton in the quantity of half a dram, in the form of a bolus, to two other persons affected with tertians, which had resisted the common practice; one for the space of two,

the other four months. This dose produced vomitings and purgings. On the first dose, the cold fit disappeared, as in other instances: the patients took two doses successively, with the same effect as the first. One of the persons was perfectly well the next day: the other had only a very slight *ressentiment* next day. Each of the patients took the remedy in the quantity of eight grains for some days, and were perfectly cured.

This is the substance of M. Mallet's experience on the quinquina-piton, from which, we may readily infer the great importance of this remedy. Its activity is manifested by its effects in small doses; but as M. Mallet has given us some conclusions on this subject, we shall lay the substance of them before the reader, and then proceed to relate our own experience on this article. The result of our experiment is, says he,

1. That the quinquina-piton, taken in decoction, prepared by two drams to an English pint of water, and in the dose of one dram, or even half a dram in the form of bolus, is emetic and cathartic.

2. That it cures recent intermittents; that it suspends those which are old, and have, for
a long

a long time, resisted the action of common Peruvian bark ; and we have reason to suppose that it would radically have cured them, if it had been possible for me to have given other two doses to the sick whom I treated, and who would not continue its use.

3. That its action is very quick.

4. Lastly, That the property which it possesses of vomiting and purging, is an advantage which ought to give it the preference to the common bark, in the treatment of intermittent fevers, since it unites the faculty of evacuating the sick, and producing a cure of the fever. By these two properties united, the great inconveniencies of the bark are guarded against. Obstructions, dropies, cachexy, says M. Mallet, and a variety of other diseases, which are too often the sad consequences of the bark improperly administered, are prevented. If we likewise consider the quinquina-piton in a political view, we believe that, independently of those advantages which we have mentioned, it deserves the attention of government, and that it may become a new branch of commerce to France of great importance *.

* Vid. Journal de Physique, Mars, 1782.

Such is the result of M. Mallet's experience; those who favour the doctrine of obstruction will agree with him, and be disposed to attribute much to the evacuating effects of this remedy; but when we attend to the particulars of his communication, we shall be disposed to think, that smaller doses of the medicine would have produced the same cures with less inconvenience to the patients. Emetics are often effectual remedies; and it undoubtedly is a great advantage of this bark, that it possesses a laxative quality; but it is only in particular cases, that we would wish it to vomit or purge. Several of my friends have been disappointed in their expectations, by giving their patients too large a dose of the *Cinchona Sanctæ Luciae*, which produced the effects described by M. Mallet. In some of the London hospitals, this species of bark was found to cure several intermittents and obstinate complaints, in doses of a scruple; but as that dose often proved emetic, the medicine was often laid aside too soon.

I have had an opportunity of making several fair trials with it, and was at first, like other practitioners, under some embarrassments, occasioned by its proving emetic, in
smaller

smaller doses than I expected; but I now find the doses of five, eight, or ten grains, repeated at short intervals, produce all the good effects of the largest dose of common or red bark.

A few grains of *canella alba*, or *species aromatica*, make it sit easy on the stomach, in the form of powder or bolus; and the proportion of one dram, or in some cases, half that quantity, infused twelve hours in one pint of water, is sufficiently strong; and a draught composed of one ounce of this cold infusion, with two drams of the spirituous tincture, and a few drops of the tinct. thebaic. produces the best effects. In three quartans, which had withstood the uses of the common and red bark for near three months, eight grains of this medicine, conjoined with five grains of *canella-alba*, taken three times a day, beginning immediately after a fit, and repeating the dose every two hours, on the morning of the day on which the paroxysm was expected, entirely prevented the fit. The patients were ordered to continue the medicine for several days.

In two of the cases, where these directions were observed, the disorder did not return;
but

but in the third, the bark being omitted the day before the usual fit, the patient had a slight return of fever, which was removed effectually by repeating the medicine.

In four cases of tertians, which had continued for several weeks, and two of which had resisted bark, bitters, and alum, in large doses, the *Cinchona Sanctæ Luciae* produced speedy cures: but the most surprising instance that I have met with of its good effects, was a case of dyspepsia, or disorder in the stomach.

The symptoms of the disease were complicated: the patient had no desire for food, his countenance was yellow, he had a fixed pain in the right hypochondrium, was troubled with flatulency, and tormented with spasmodic pains in his stomach and bowels; his legs swelled considerably in an evening, and he sometimes awoke suddenly in the night-time, with a difficulty in breathing, and great oppression about the præcordia. He had an habitual obstipatio, and was supposed to labour under a diseased liver. He had taken several medicines without effect, and was thought incurable. He was ordered a slight infusion of this bark, of which he took one ounce, with two drams of the
spiri-

spirituous tincture, twice a day ; his appetite began to grow better, and it was proposed to increase the strength of the infusion. The proportion of the bark was two drams to eight ounces of water ; at first this increase produced nausea, and a slight degree of purging, but on the addition of seven drops of the tinct. thebaic. the medicine sat easy on the stomach ; and in the course of ten days, the swellings in the legs entirely disappeared, the patient recovered his appetite and strength, to the great surprise of his friends ; and by the assistance of gentle exercise and proper diet, was so well recovered in three weeks, as to be able to undertake a journey to a considerable distance. The yellowness of his countenance was not entirely removed, but the pain in his side considerably abated under the use of the *Cinchona Sanctæ Luciae*, which kept his body gently open, and I am informed that he has omitted his medicines, and continues pretty well.

Since the former part of this work went to the press, the apothecaries in this place have provided themselves with the *Cinchona Sanctæ Luciae*, and I have had an opportunity of trying it in the autumnal diseases of this

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season.

season. The medicine has answered my most sanguine expectation; and I shall conclude these remarks with a few cases which happened under my care, and are well known to the medical practitioners of this neighbourhood.

H. C. a labourer in an adjoining village, was seized with a cold fit and shivering, succeeded by heat, and attended with a violent pain in the head, accompanied with sickness, oppression about the præcordia, vomiting and purging. On the third day he took an emetic, which operated well, but his complaints were not relieved. On the eighth day I was desired to visit him. His pulse was then one hundred and twenty in the minute, the pain of his head violent, and the purging not abated; his stools were copious, and tinged with blood; his breathing difficult, his body covered over with a clammy sweat, and he complained of extreme weakness, excessive thirst, and want of sleep.

His wife was in the same bed with him, confined by nearly a similar complaint, unattended with purging. They were ordered each tinct. theb. gtt. xxx. at bed-time; and the

the next day put upon the use of the following mixture :

R. Cinchonæ Sanctæ Luciae ʒij.

Canell. alb.

Cort. aurant. hisp. āā. ʒi. affunde aquæ bullientis ʒxij. macera per horas sex dein colaturæ.

Adde

Conf. cardiac. ʒij.

Tinct. Cinchon. Sanctæ Luciae ʒij. m. fumantur cochl. ij. amp. ʒ^{tia}. vel 4^{ta}. quâque horâ.

This mixture agreed very well with their stomachs ; the pain of the head abated, and they were able to take food. The anodyne was repeated ; they had each a good night ; the man's purging ceased ; his pulse, on the second morning after taking the mixture, was sunk to ninety-four, and he found himself so well as to be able to get out of bed.

The woman complained of nothing but weakness ; was enabled to eat a bit of chicken for dinner ; and having no more return of her complaints, recovered in a few days. Her husband had a slight return of the fever for some evenings, but by the use of the mixture, is now pretty well recovered.

A. B. a labourer in the same parish, had been for some weeks afflicted with an obstinate diarrhœa, which commenced with a febrile paroxysm. He lost his appetite and his strength, complained of pain in his stomach and bowels, and was considerably emaciated: in this state I ordered him the use of the mixture above prescribed, with the infusion of the *Cinchona Sanctæ Luciae*. It had the desired effect, and in eight or ten days the patient was so well recovered, as to be able to go about his usual occupations.

E. M. was seized with a cold fit and shivering, succeeded by heat, and attended with sickness, vomitings and purgings. She complained of a violent pain in her head and back, had great depression of spirits, loss of appetite, and prostration of strength. On the ninth day of her complaint, I was desired to visit her. She had been delirious a few hours before I saw her, but gave rational answers to my questions, and complained chiefly of pain in the head. Her pulse was one hundred and twenty, belly regular, and vomitings abated. She had got little sleep since the commencement of her disorder, and had a considerable degree of thirst upon her.

I ordered tinct. theb. gtt. xxx. at bed-time : she got some sleep during the night, and in the morning her pulse had sunk to ninety-eight ; the pain in the head was abated, and she was able to take broths and cordials the next day. The following powder was then prescribed :

R. Cinchonæ Sanctæ Luciae.

Canell. alb. aa. gr. vij. ft. pulvis 4^{ta}.
quâque horâ ex cyatho theæ melissæ fumendus.

This medicine agreed very well with her stomach: she found her appetite grow better, and was apparently in a fair way of recovery, when she was unfortunately seized with a miscarriage, being in the third month of her pregnancy: this accident had threatened a few days before, but the symptoms had disappeared. On this occurrence she began to be alarmed ; the discharge of blood was very violent, and her attendants began to apprehend immediate danger. Her body was covered over with a cold, clammy sweat, her heart palpitated, and she fancied herself in the agonies of death. I prescribed tinct. theb. gtt. xxx. to be taken immediately, and recommended the free use of port wine and

other cordials. She followed this plan, and in a few hours found herself easier, the palpitation of the heart abated, and she took some broths. At night she repeated the anodyne, and in the morning awoke considerably refreshed. The discharge of blood continued, and she had very little desire for food. She was then ordered the mixture with the infusion, and tinct. Cinch. Sanct. Luciae, as prescribed above, which is the general form I use for paupers: under the use of this, and suitable diet, she gradually gathered strength; and in eight or ten days was so far recovered, as to be enabled to walk out of doors. The discharge entirely abated, and she is now in pretty good health.

S. S. a young woman, aged twenty-two, lately put herself under my care for the cure of a quartan, under which she had laboured fifteen months, except three weeks in the month of June last, when it appeared to have left her; but since that period, it had continued constant in its return. She came to me on the morning of the day on which she expected the fit, which generally commenced about two o'clock in the afternoon. Not thinking it probable that the return of the
fit

fit could be prevented that day by the use of the cinchona, I ordered her a draught with tinct. theb. gtt. xxx. to be taken an hour before the usual return of the paroxysm; but it did not appear to have had any effect, the fit recurred as usual. The next day she was put upon the use of the following powder.

℞. Cinchonæ Sanctæ Luciae.

Canellæ albæ aa. gr. viij. m. ft. pulvis, tertiâ vel quartâ quâque horâ ex cyatho infusi chamæmeli usque ad solitum paroxysmi reditum, sumendus.

The first two or three doses agreed very well, but two taken in the morning fasting were rejected by vomiting. The camomile tea being omitted, and the powders taken in a spoonful of water, were retained. She had but a slight return of the next fit, and by the use of the following powder twice a day for ten or twelve days, got perfectly well.

℞. Cinchonæ Sanctæ Luciae gr. v.

Spec. aromatic. gr. viij. m. ft. pulvis bis die ex cyatho aquæ sumendus.

This patient had taken large quantities of the bark, with a variety of other medicines, without any effect.

Mr. W. was seized with pains in his head, back and loins, oppression about the præcordia, sickness and loss of appetite. His tongue was parched and dry; he had considerable thirst; his pulse was one hundred and ten; belly regular. In this state he continued for seven days: on the morning of the eighth, I was desired to visit him. He had had a very bad night, was uneasy, and laboured under some degree of dyspnæa. I ordered him a draught, with an infusion of the *Cinchona Sanctæ Luciae*, and spirituous tincture, twice a day, with an anodyne at night. The medicines had the desired effect; his appetite began to recover; his pulse sunk to its natural standard, and he had no more return of fever. The anodyne was continued for a few nights; and on the fifth day after the use of these medicines, he was so well recovered as to think farther medical assistance unnecessary.

These are the only cases which I shall at present lay before the reader; and as I have never met with an instance in which the *Cinchona Sanctæ Luciae* failed, when properly administered, I must certainly entertain the most favourable opinion of its efficacy in small doses. The addition of aromatic species,

cies, or canella alba, generally makes it fit easy on the stomach, and renders it a pleasant, as well as an effectual medicine.

Only a small quantity of this bark has been imported into Scotland; but from some trials made with it at Edinburgh, great expectations are formed from its general introduction into practice. Dr. Morgan, physician at Philadelphia in North-America, has lately read a paper on the virtues of this bark to the *American Philosophical Society, held at Philadelphia, for promoting useful Knowledge*; from which it appears, that it had proved very effectual in the diseases of that climate. The medical practitioners in Barbadoes, Antigua, Grenada, and Tobago, likewise speak in high terms of its success in many obstinate diseases, where other barks had failed. I shall not therefore protract my account by any farther detail of observations upon this article, but shall be happy to find that the opinion I have formed, is confirmed by the successful practice of the medical practitioners in this island.

SECTION

SECTION IV.

GENERAL OBSERVATIONS ON THE BARK.

HAVING related our experiments and observations on the different species of bark with which we are at present acquainted, we shall now proceed to make some general remarks on the use of this remedy.

Ever since the introduction of the bark, practitioners have turned their attention to the various modes of preparation ; they have puzzled themselves respecting its action, and they have severally disagreed in their accounts of its exhibition in disease. To make some cursory observations on these important points, is the intention of this section.

 C H A P. I.
On the Preparations of Bark.

THE experiments which we have made on the different species of cinchona, will enable us to reason with some degree of certainty on this important part of our subject.

Acids,

Acids, alkalies and neutral salts, have all been mixed with bark ; and the substance of this vegetable has undergone many a tedious process of maceration, decoction, infusion, &c. &c. with these active substances, with a view of receiving activity and strength from such conjunction: but from our experiments it will appear, that these salts are always improperly added to the preparations of bark. We shall therefore now enquire into the officinal preparations, which are “ an extract (L.E.) resin (E.) spirituous tincture (L.E.) tincture in volatile spirit (L.) and compound tincture (E.) It is also an ingredient in the stomachic tincture (E.)” Lewis’s Disp. p. 197.

The soft and hard extracts are prepared with water, boiled with the same bark till the liquor remains transparent when cold, and only differ in point of consistency. The Edinburgh college directs the extract to be prepared by first digesting the bark, in rectified spirits of wine, for four days, then boiling the residuum in water, and evaporating it to the consistence of honey ; after which, the spirit being drawn off from the tincture to the same consistence, the two extracts are carefully

carefully mixed together, and evaporated to a proper consistence ; so that we have in this preparation all the virtues of the Peruvian bark that can be extracted by water or spirit. Dr. Lewis seems to have been well acquainted with this fact, though he mistook the nature of the principles of the bark. “ In the bark,” says he, “ we may distinguish two kinds of “ tastes, an *astringent* and a *bitter* one ; the “ *former* of which seems to reside in the “ *resinous matter*, and the latter chiefly in the “ *gummy*. The watery extract is moderately “ strong in point of bitterness, but of the “ astringency it has only a small degree. “ The pure resin, on the other hand, is “ strong in astringency, and weak in bitterness. Both qualities are united in the “ present (Edin.) extract, which appears to “ be the best preparation of this kind that “ can be obtained from this valuable drug.” Lewis’s Disp. p. 413.

We entirely agree with the author in his sentiments of the Edinburgh extract, but have already pointed out his mistake of the nature of the bark ; which is indeed surprising, considering the general accuracy of his observations.

Tinctures

Tinctures of the bark have been long in use. The London Pharmacopeia orders four ounces of the bark to two pints of proof spirit. The Edinburgh Dispensatory orders the same quantity of bark to two pints and an half of spirit. These are undoubtedly excellent preparations ; and if the red bark be used, the latter quantity of spirit will be preferable. Some have thought to assist the action of the spirit by the addition of a little fixed alkaline salt, whilst others have added vitriolic acid ; but we have already decried these notions. In the London Dispensatory we have a *tinctura corticis Peruviani volatilis*, which is prepared by infusing four ounces of the bark with two pints of spirit of sal ammoniac. “ This tincture,” says Lewis, “ is
 “ but lightly impregnated with the virtues
 “ of the bark ; and is so acrimonious, that
 “ the largest dose which can with safety be
 “ given of it, can contain only a very small
 “ quantity of the subject. The medicine,
 “ nevertheless,” adds he, “ has its uses, and
 “ may be serviceable in some cases where
 “ the stronger are improper, as in difficulty
 “ of breathing, obstructions, and oppressions
 “ of the breast. Stronger tinctures of this
 “ kind

“ kind may be obtained by means of dulci-
 “ fied spirit of fal ammoniac, or the spirit
 “ prepared with quick-lime. All the three
 “ may be employed where a large quantity
 “ of bark is not required, as at the close of
 “ the cure of intermittents, in weakness of
 “ digestion, attended with a cold sensation
 “ at the stomach, and some fluxes, particu-
 “ larly those from the uterus, where the
 “ circulation is languid, the fibres relaxed,
 “ and where there is a periodical return of
 “ slight feverish complaints. In these cases,
 “ I have often experienced salutary effects
 “ from a tincture in dulcified spirit of fal
 “ ammoniac, given to the quantity of a tea-
 “ spoonful five or six times a day, in any
 “ appropriated vehicles.” Lewis’s Disp. p.
 309.

Notwithstanding the eulogy that the Doc-
 tor has passed upon this preparation, we
 cannot overlook the first part of his account,
 but must believe with him that it is indeed
 a weak preparation of the bark.

The nature of the menstruum should cor-
 respond to the intention of the medicine.
 If we wish to exhibit the bark as an astrin-
 gent, the cold infusion is preferable to any
 other

other preparation. The decoction is often a better stomachic medicine than the infusion; and the tincture in spirit is generally an excellent addition to either, as it unites powerfully both the active principles of the bark. Wine is very much inferior to spirit, but when devoid of acid, may be used with advantage. In the *tinctura corticis Peruviani composita* (Edin.) the addition of snakeroot and gentian was certainly of service, though the college has omitted these ingredients and the tincture, in their last edition of the Dispensatory. Huxham's tincture of the bark appears to be a good preparation, and we have often found the addition of *canella alba* of great service to the tincture, infusion, decoction, or powder of bark.

The extract of bark has lately fallen into disrepute: indeed, like some other preparations of the bark, it has been much misunderstood. Under the same word may be included two preparations very different. The watery extract is chiefly composed of the astringent gum, and the spirituous extract of the bitter resin. This knowledge is of the greatest utility in practice; for although we may commit the mistake with impunity in
the

the common preparations of infusion, decoction, or tincture, yet when we come to exhibit the pure principles of the bark *per se*, it is of the utmost consequence to attend to the distinction. The gum, which is soluble in water, is perhaps one of the first astringents in the Materia Medica; in practice we should therefore attend to prescription, and specify the extract which we wish to employ. The neglect may be attended with danger to the patient. Let us suppose, for instance, a person in the last stage of a violent diarrhœa, the discharge is very profuse, the patient much reduced, and we wish to exhibit the bark; the extract is fixed upon, as most likely to sit upon the stomach; the resinous or spirituous extract is given, every symptom is aggravated, and the patient purged out of this life, by the ignorance or inattention of his physician. Such might be a patient's fate, whilst the knowledge and just exhibition of the astringent gum would have saved his life. Not, however, to spend more time in conjecturing mistakes which too often occur in real practice, I shall conclude these remarks with observing, that the simple powder of bark is often preferable to any preparation.

C H A P.

C H A P. II.

On the Action of the Bark.

AS the Peruvian bark was first introduced into practice for the cure of a disease, the nature of which had been long misunderstood, it is no wonder that the theory of its action has been obscured.

At first it was confined to the intermittent, but in course of time it was administered in other diseases apparently of a different tendency ; hence, whatever theories had been formed of its *modus operandi* were now deserted. The doctrine of Lector was long an enemy to the bark, even in agues ; and in continued fevers it was thought a poison. Some bold practitioners, however, ventured to give it early in febrile complaints, that raged with violence in hot climates : the best effects ensued from its use, but theory long prevented its exhibition in Europe. The prejudice of opinion began at length to be

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dispelled,

dispelled, and preparations of the bark gradually crept into use in the low nervous fever. In that species attended with petechiæ, or tendency to putrefaction, it was found particularly serviceable; hence sprang the doctrine of its antiseptic virtues: it was now esteemed a powerful corrector of depraved fluids, and in every case where the humours were supposed to be corrupted, it was boldly exhibited, and with the best effects. Chemical experiment appeared to give great probability to this theory of its action; but by the same investigation we were taught, that the most powerful stimulants were the best antiseptics. The experiments of Sir John Pringle inform us, that volatile alkali is one of the best antiseptics; a fact which at first appeared incredible, as alcalescence was generally esteemed a putrefactive ferment. The doctrine of fever, introduced by Hoffman, and improved upon by Dr. Cullen, seemed to open a new view of the operation of remedies. Debility, the supposed cause of spasm, together with that modification of it, termed atony, was to be cured alone by tonics; hence the Peruvian bark was said by Dr. Cullen to act as a tonic. This was undoubtedly

doubtedly a great innovation in practice, and led to an entire new view of disease. The doctrine of crisis, or critical evacuations, received a shock in this explanation; for as Senac observes, “ *Abſque criſi equidem tolli*
 “ *febres corticis Peruviani opera plerique*
 “ *perſuaſum eſt; nam veluti uno ictu eas*
 “ *aliquando eliminat, nec tamen evacuationes*
 “ *per alvum, aut per urinæ, ſudorisque duc-*
 “ *tus molitur: eas ſaltem ſibi non occuriſſe*
 “ *multi tradunt*.*”

Observations of this kind give great probability to Dr. Cullen's opinion; and we are inclined to believe, that the bark operates on the ſolids, and produces its effects by its action on the ſtomach, without any reference to its being abſorbed by the lacteals, or carried into the circulating maſs; but it may be worth our while to enquire here into the nature of tonic remedies: in doing this, we muſt beg leave to make uſe of Sir Iſaac Newton's rules of philoſophizing, and

“ 1. Admit no more cauſes of things than are ſufficient to explain appearances. And

* Senac de Recondit. Nat. Febr. cap. vii. l. 2.

2. To the same effects we must, as far as possible, assign the same causes*.”

Tonic, in the present sense, is nothing more than a remedy that has the power of increasing the tone, or moving powers of the animal machine. Various kinds of food, and medicines produce the same effect. Thus a good dinner, or a glass of wine, adds vigour to the system, and increases the tone or strength of a person previously debilitated. A glass of brandy will have the same effect, though less permanently. And if a dose of bark is found to be equally, or in many cases more effectual, why not conclude that it produces the self-same end, in the self-same manner? The effect of a glass of wine, may be less transitory than that of a glass of brandy, and a dose of bark more permanent than either; but they differ in degree, not in essence. They both act as tonics, and equally deserve that appellation: but no writer, no practitioner in physic, has called a glass of brandy a tonic remedy. In the same manner, light is one of the most powerful tonics of the

* Vid. Newton's Princip. Book III. p. 1.

animal and vegetable kingdoms. Of many vegetables it is a necessary *pabulum vitæ*; without it they pine, wither, debilitate and die: yet no one has styled this a tonic power. It is called a stimulant, and said to operate by its stimulating powers. Are we then to forsake philosophy? Are we to admit diversity of effects from the same cause? or rather, are we to admit one uniform cause, producing the same effects? The distinction into tonics and stimulants may be made by those who love division, for the sake of subtilty; but true philosophy despises what misleads the mind: and when I say a glass of wine stimulates a man to action, I mean the same as if I said it increased his tone or power of action at the time. If a known stimulus produces the same effect as a tonic, I have reason to conclude, it does it in the same manner. Is not this argument supported by just reasoning and true logic? To reason otherwise, is to reason falsely; and to forsake reasoning in physics, is to make medicine rash empiricism. Additional arguments might be brought to support my opinion, and I could add weight to my supposition from analogy. Wherever the bark is required,

direct stimulants are found of great service : thus good living, generous diet and exercise, are constantly prescribed with the use of this remedy : but to point out farther the analogy betwixt the bark and other stimulants, will be unnecessary. From what we have said, it will appear, that the term specific is improperly applied to the action of the Peruvian bark. Its action is the same as other remedies that cure diseases of debility, and is not enveloped in any dark mystery. It is a stimulus that very often is well adapted to disease ; but, we believe, many lives have been lost by its mistaken use. Even the tonic doctrine has been productive of error ; and this remedy has been relied on, where more diffusible stimuli were required. But we shall not attempt in the present page to trace the errors of medicine ; to explain our own doctrine will be employment enough, and that we attempt in the following experiments.

Exp. 1. At seven o'clock in the morning, when my pulse was at sixty-two in a minute, I took half a dram of common Peruvian bark. Continuing to sit still, and make observations on my pulse, I found that in three minutes
after

after taking the dose, it beat sixty-six, and I began to feel a considerable degree of heat suffuse itself over my face, hands, and whole body. In five minutes more, my pulse rose to sixty-nine, and in ten minutes was at seventy-six, where it continued for near two hours, and then gradually sunk to sixty-four.

Exp. 2. At seven o'clock in the morning, my pulse beating sixty-two in the minute, I repeated the former experiment, with nearly the same result; but when my pulse had sunk to sixty-eight, I repeated the dose of bark. In three minutes, my pulse was seventy-two; in five, seventy-six; and in ten, eighty-four, where it continued near an hour, then gradually sinking to its usual standard, sixty-four or sixty-six.

From these experiments I would infer the direct stimulating power of the bark: the heat, and quickness of the pulse, shew the vigour of the heart to be increased; and the length of time which this change continued, manifests the permanency of the stimulus which produced these effects. The nature of this work will not allow us to pursue this enquiry; otherwise, analogy and successful practice might be brought in support of our

doctrine. The drowsiness and sleep sometimes produced by large doses of bark ; the exhibition of opiates in intermittent fevers, as advised by Dr. Gregory and Dr. Lind ; together with the mode which Dr. Cullen advises, of exhibiting the bark at short intervals before the expected return of a paroxysm, would seem to strengthen our supposition : but the minds of men must be divested of prejudice, before analogies can be admitted, which militate against a favourite hypothesis. The analogy betwixt wine and opiates is now pretty generally allowed ; and we have no doubt but farther analogies will in a short time be universally acknowledged ; and that the specific quality of the bark will be found to reside in its permanent stimulant action on the nervous system.

C H A P III.

General Observations on the Use of the Bark in Disease.

FROM the principles which we have attempted to establish on the operation of this remedy, pretty clear ideas may be drawn *à priori*, respecting the diseases in which it will

will be of service. It will not be necessary to enter minutely into this part of our subject; general observations will suffice, and as we speak chiefly from experience, we shall not search for medical authority to support our argument in every instance.

The bark is one of the most powerful remedies with which the world is blessed, but it is nothing more than an auxiliary of health: and without strict attention to other circumstances, its repeated dose is of no avail.

Regimen is its grand assistant, and we may in vain prescribe our medicine without we injoin its aid. No rule, perhaps, is so universal as that which we are able to form on this subject. It is a general rule, as far as I know, without one exception, that whenever the bark is indicated, generous diet will be found useful: but the great point will be, to ascertain the due bounds of this expression, and regulate the proper use of food. The nature of nutriment appears to have been much misunderstood. Some philosophers have contended for a vegetable diet, others an animal, and the wiser for a mixture of both, as the proper food of man. The structure of our bodies, the formation of our teeth,
and

and a variety of other anatomical arguments support this opinion; but even those who argue thus philosophically, seem to entertain false notions on the principle of nutriment. Vegetables have been supposed to contain a peculiar matter of a saccharine nature, which by animal process is converted into gluten, or animal substance; hence patients of debilitated constitutions, and emaciated habits, have been confined to a vegetable diet; and milk*, as containing abundance of this saccharine matter, and partaking, but in a small degree, of the animal nature, has been copiously administered: but we have seen several cases which incline us to believe, that this opinion is not founded in truth. Persons who live much on animal food, and indulge in the use of fermented liquors, are seldom afflicted with those diseases which affect people accustomed to a more spare diet; they are in general much stronger, and only liable

* Notwithstanding what is here said against a milk diet, the author confesses to have an high opinion of it in certain cases: but this subject he means to pursue more fully, when he has leisure to compleat his dissertation, which was honoured with one of the Edinburgh Harveian prizes, April 12, 1783.

to accidental illnesses of an inflammatory kind. This fact tends to confirm the opinion, that animal food is most nutritious, and a certain daily portion of it appears necessary for the health of the human system. When the strength of the body is impaired by asthenic disease, it becomes more necessary; and in all those cases which require the use of stimulating medicines, the work of the physician will soon be undone by diet of an opposite nature. I have seen a patient just relieved from the most excruciating stomachic complaints by the use of bark, and medicines of a similar nature, thrown into the most convulsive agony by imprudently eating a slice of apple or other raw vegetables. We cannot therefore too strictly enjoin abstinence from this improper food, and strenuously recommend the use of a more generous diet, of that kind of animal food, which the taste of the patient may render most convenient. On several occasions, animal broths may be preferable to solid meat. The stomach is sometimes unable to digest even strong broths. We must then consult the various arts of cookery, and sometimes are obliged to have recourse to vegetables,

tables, all other diet being, in certain cases, of great debility, too stimulating. These are cases which require peculiar attention; and we may depend upon it as a certainty, that our patient is in a fair way of recovery when he can bear generous food, which never should be denied under proper restrictions. The great art is, not to overload the stomach; but so many little circumstances are to be attended to in this respect, that we shall not weary the patience of our reader by a detail of luxurious or culinary rules.

The use of wine, spirits and water, or malt-liquor, may be properly conjoined to that of bark. Care should be taken that each be good of its sort; a mixture of spirits and water generally makes the best beverage. If wine does not turn acid, or strong-beer produce flatulency, small quantities may be used with the greatest advantage.

So much for the regulation of diet.

Exercise is generally a powerful auxiliary to the bark when it can be conveniently used. Its mode may be varied according to the circumstances or disposition of the patient. Riding on horseback, in a carriage, walking or sailing, have their respective advocates.

Having

Having premised thus much on regimen, we shall proceed to speak of some diseases in which the bark is given with success.

Inflammation is commonly attended with so many symptoms which forbid the use of stimulants, that we shall appear at first sight, to have seized the wrong end of nosology, and treat of a disease in which our remedy can never be useful. Inflammation is of various kinds; increased heat in a part, quick strong pulse, and other symptoms of increased action in the system, require the use of antiphlogistics; but even this species of inflammation in its termination, frequently calls for the aid of bark. Gangrene is cured, and sphacelus prevented by its liberal exhibition. Ill conditioned abscesses and foul ulcers often require its use; and there is one peculiar form of local inflammation, in which the cortex has lately been given with incredible advantage.

The *scrophula* or *king's-evil*, has been called one of the endemial maladies of Britain. Its symptoms are various; but the subjects of this dire disease are generally of the most puny and debile constitutions; inflamed eyes are commonly the first, or at least the most obstinate symptoms of the complaint; bleeding,
 purging,

purging, and the antiphlogistic regimen never fail to increase the disorder, whilst a contrary method is found of the greatest service.

The *erysipelas* generally occurs as an inflammatory disease; but there is one species of it, which Dr. Cullen calls the phlyctænodes, that is sometimes attended with symptoms of mortification or gangrene: this most commonly happens in warm climates, or in hot seasons. In such cases the bark is the only remedy.

The *quincy*, or *fore-throat* appears in various forms, happening to the robust and healthy of every age and sex. Its most common cause is accidental exposure to cold, and under such circumstances it generally terminates favourably in a few days, without the use of medicine; but there is one species denoted the *putrid*, or *malignant fore-throat*, in which the utmost skill of the physician is required to save the life of the patient.

The reigning symptoms of this complaint are, swelling and discoloration of the tonsils, and mucous membrane of the fauces, which is covered with whitish, livid, or ash-coloured spots, and spreading ulcers of a malignant nature;

nature; the patient's breath is extremely foetid and offensive, his pulse is low and weak, and a scarlet eruption generally covers the surface of the body. Dr. Fothergill has shewn the use of bark in this complaint. The decoction or infusion makes a good gargle, but must not supersede the internal use of this remedy.

The *rheumatism* is properly divided into acute and chronic; the former species most commonly occurs after exposure to cold, and is a pure inflammatory disease for some days, when it degenerates into the latter, which is often one of the most afflicting maladies of old age. The external and internal use of stimulants affords relief; and the bark often performs a cure, when other remedies have failed.

The *small-pox* is commonly ushered in with every symptom of increased action, and continues under this form for the first eight days; the suppuration of the pustules commences, and a train of different symptoms begins to appear. In the discreet or regular small-pox the secondary fever is generally slight, sometimes not at all observable. In the confluent, the disease runs a different course, the
pustules

pustules are very numerous, appear flaccid, never assume that turgid elevated appearance which distinguishes the regular. The fever is of the low nervous kind, petechiæ appear in various parts of the body, and every symptom of debility prevails. In such instances, the bark has been strenuously recommended by the late learned Professor Monro, and daily practice evinces the utility of his discovery.

Hæmorrhages have, since the days of Stahl, commonly been considered as phlogistic diseases, and in almost every instance evacuation has been prescribed; but I have lately known several instances of the good effects of a contrary treatment. A case of this kind occurred to my knowledge. A gentleman who had, at the age of sixty, entered on an abstemious course of life, and low diet, was seized with a profuse bleeding from the nose; to stop which, the practitioner bled him at the arm, the disorder increased, the blood-letting was repeated, and every symptom aggravated, till at length the weakness of the patient pointed out the error in practice; a contrary method was tried, and the patient recovered under the use of bark and wine. I could relate several instances of the bad effects of
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the antiphlogistic treatment of hæmorrhagy, but it would lead me into too wide a field. A due discrimination betwixt active and passive discharges of blood, marks the experienced physician.

Hæmoptysis, or *spitting of blood*, has long been considered as one of the most incurable diseases; and the generality of practitioners will agree with me that they have seen few instances of genuine idiopathic hæmoptysis treated in the common method, terminate favourably: a phthisis is almost a certain consequence. I have lately paid considerable attention to this fatal complaint, and have ventured in another work, to differ from the common opinion delivered by authors.

Experience seems to have convinced some very attentive observers upon the Continent, of the impropriety of the common mode of treatment in hæmoptysis. Speaking on this subject, Lieutaud says, “ *venæsectio, ineunte*
 “ *morbo, in nonnullis proficua censetur: alias*
 “ *inutilem operam navat, vel noxam infert:*
 “ *hanc præcipue solent imperiti, in hacce*
 “ *febris acutæ specie, quæ à tuberculorum*
 “ *inflammatione, & suppuratione sobolescit:*
 “ *sed ab hac intempestiva sanguinis missione,*
 I “ *pluries*

“ pluries iterata, ad æthereas sedes properasse
 “ ægros pluries vidisse memini *.

It may perhaps be objected, that Lieutaud here speaks against blood-letting in the more confirmed stage of phthisis, but the learned Ludwigi^{us}, has given his opinion in more expressive language. “ Fateor in his corporis
 “ dispositionibus, sæpe nullum auxilium
 “ afferendum esse. Si enim ex *debilitate ner-*
 “ *vosa*, vera vis sanguificationis & in optima
 “ sæpe ætatis vigore, deficit, *morbo hæmop-*
 “ *toico*, casu superveniente, non solum post
 “ venæsectionem repetitam, tenuis sanguis
 “ porro effluit, & sæpe continuatæ eruptionis
 “ per hæmoptoem causa est, sed & tum san-
 “ guinis effluxus, solo exquisitissimo diætæ
 “ regimine cohibetur, vera circulationis vis,
 “ & boni cruoris, reliquorumque humorum
 “ elaboratio nunquam restituitur: languor
 “ corporis subinde inducitur, & tabes inevi-
 “ tabilis crebra reddit juvenum funera. Sic
 “ sæpe in primo morbi hæmoptoici insultu,
 “ languida corporis dispositione visa, tristem
 “ sæpe prognosin enuntiat medicus, & sanos
 “ sæpe juvenes ad hos morbos dispositos ex-

* Lieut. de Morb. intern. pect. c. depthin.

“ hortatur,

“ hortatur, ut corporis vigorem universum
 “ accurata diætâ sustineant, ne levi sæpius
 “ hæmoptoes insultu affecti, ex imbecillitate
 “ pereant *.

From the observations of these great men, conjoined to our own experience, we will venture to prescribe the use of bark and its auxiliaries, in most cases of this disease.

The *Menorrhagia* is a disease peculiar to the female sex. The increased discharge, which characterises this complaint, occurs most commonly to women previously exposed to powerful debilitating causes; and in some cases which I have lately attended, the bark produced cures when other remedies had failed. The practice of several of my medical friends confirms this observation.

There is another female complaint, apparently of an opposite nature, but often proceeding from the same causes, in which the bark is of acknowledged use. The *Amenorrhæa* occurs to women previously debilitated, and can only be effectually cured by the bark, generous diet, and the free use of exercise.

* D. Christ. Gottlieb. Ludwigi Advers. p. 155. Vol. I.

Diarrhœa is often a temporary disease, and frequently is cured without the aid of medicine; but sometimes it becomes very violent, arises from every slight debilitating cause applied to the alimentary canal, and in such cases threatens great danger. The bark, as liable to run off by stool, has not been commonly administered in these cases; but I have seen examples of its efficacy, one of which is recorded in the chapter on the medical effects of the *Cinchona Sanctæ Lucæ*.

In that distressing congeries of complaints, which Dr. Cullen has so elegantly described under the title of *Dyspepsia*, or *Affections of the Stomach*, our medicine affords the greatest relief, and is seldom found to fail in performing a speedy cure. Dr. Home informed us, in his clinical lectures in the year 1782, that he had laboured under dyspeptic complaints for ten years, had taken a variety of medicines without effect; but at length, having recourse to the bark, was effectually cured. I have been witness to several remarkable examples of its efficacy in public and private practice. The *Gout* frequently makes its appearance under such a form, and produces the most dreadful effects in its
lingering

lingering consequences ; in these instances the cinchona may generally be employed with great advantage.

Asthma is a disease which appears to be justly distinguished into species, requiring a different mode of treatment. When it occurs to the sanguineous or plethoric habit, blood-letting and emetics prove serviceable ; but the spasmodic asthma generally occurs to persons of the most debilitated constitutions, and is only to be cured by the use of bark, opiates, and other stimulants.

Fever has been considered as a general inflammation : pyrexia or increased heat makes a principal part of its character ; and in its treatment, every heating thing has been carefully avoided. The want of a due discrimination betwixt the low, nervous, and inflammatory fever, has given rise to the indiscriminate use of the antiphlogistic regimen, which has proved the bane of medicine and recovery. Some facts, some astonishing facts, within these few years, have led to the free use of stimulants in typhus, or fevers of the low, nervous type. Dr. Huxham long ago introduced the use of bark in fevers attended with petechiæ, and other symptoms of putridity ;

fridity; and we are happy in one instance, of erroneous theory having produced good practice. The doctrine of antiseptics introduced the use of remedies which cured the patient by deceiving the physician: the bark, which was swallowed to sweeten corrupted fluids, stamped vitality upon the solids, and stimulants are now acknowledged the best antiseptics. The great fatality of typhus under bad management, and its happy termination under the liberal use of bark and other stimulants, establish beyond a doubt the utility of this remedy in that species of fever.

The *Ague*, or intermittent fever, has been peculiarly favourable to our remedy. It first introduced the cinchona to our acquaintance, and gained it that attention which it so highly deserves. Intermittent fevers are distinguished into various species, and are all characterized by having paroxysms or accessions at stated periods, with manifest intermissions or remissions. The period of accession is marked by a singular affection of the system, called the cold fit; in which the patient complains of a sensation of cold, though his skin, to the touch of another person,

person, or the thermometer, manifests in general, increased heat: this sensation, which is attended with a shaking or trembling of the limbs and different parts of the body, and continues for a longer or shorter time, according to the nature and violence of the disease, is succeeded by what is called the hot fit; in which the patient complains of heat, head-ach, thirst, and every symptom of increased action; for some time the skin continues parched and dry, but on the coming on of a sweat, those disagreeable symptoms disappear, and the patient is restored to what may be called, his usual state of health; this continues till the next return of the paroxysm, which is commonly a repetition of the circumstances described. When the distance, or interval from one paroxysm to another, is forty-eight hours, the disease is called a *tertian*, and this form is observed to come on pretty constantly at noon. The *quartan* observes an interval of seventy-two hours, and has its accessions in the afternoon. The *quotidian* has an interval of twenty-four hours betwixt each fit, and its paroxysms are observed to happen in the morning. This is the common division of intermittents into

species,

species, which may generally be pretty well marked; each species has its varieties, and authors have treated of these various forms with great subtilty.

Dr. Cleghorn, in his *Diseases of Minorca*, has communicated several valuable and curious observations on this subject, which has been refined upon by Dr. Cullen, who maintains that all fevers consist of repeated paroxysms. The *remittent fever* is, according to him, nothing more than an intermittent, with a short interval, or a continued fever, with exacerbations and remissions remarkably manifest.

These are the fevers in which practitioners seem thoroughly agreed about the use of bark, and no theory now dares to exclude the free administration of this remedy in these diseases: accordingly we find all the late authors on fevers, recommending careful and attentive observation to these circumstances.

Continued fevers are those which have no intermission, do not arise from marsh miasma, which, according to Dr. Cullen, is always the cause of the former, but yet are supposed to have regular exacerbations or remissions twice a day. It would lead us too far astray
to

to pursue the subject of fever much farther : we shall therefore content ourselves with observing, that the *typhus* or *low nervous fever* is that in which the bark will be found most efficacious : regardless of exacerbation or remission, we must exhibit our medicine freely. The histories of diseases in warm climates teach us, that delay is dangerous ; without waiting for symptoms of putridity, we must attack the disease, even in its greatest rage of heat, and conquer that destructive foe of health, debility.

The *hectic fever* has long withstood the use of medicine, and practitioners have differed widely in their accounts of the efficacy of bark in this disease ; but from some late instances, we are inclined to believe, that it may be employed with success even in the advanced stages of a phthisis, when the exacerbations of this fever are most remarkable. In this opinion we are confirmed by the observation of the sagacious De Haen, whose words we use : “ Mirum profecto fuit intra
 “ quam breves dies collapsæ vires resurge-
 “ rent, febris decreveret, revivisceret, appe-
 “ titus, defœdato vultui color rediret nilorque
 “ & nocturnæ anxietates rarefcerent, blandi
 K “ obre-

“ obreperent fomni, sputisque pectus se com-
 “ mode evacualet *.”

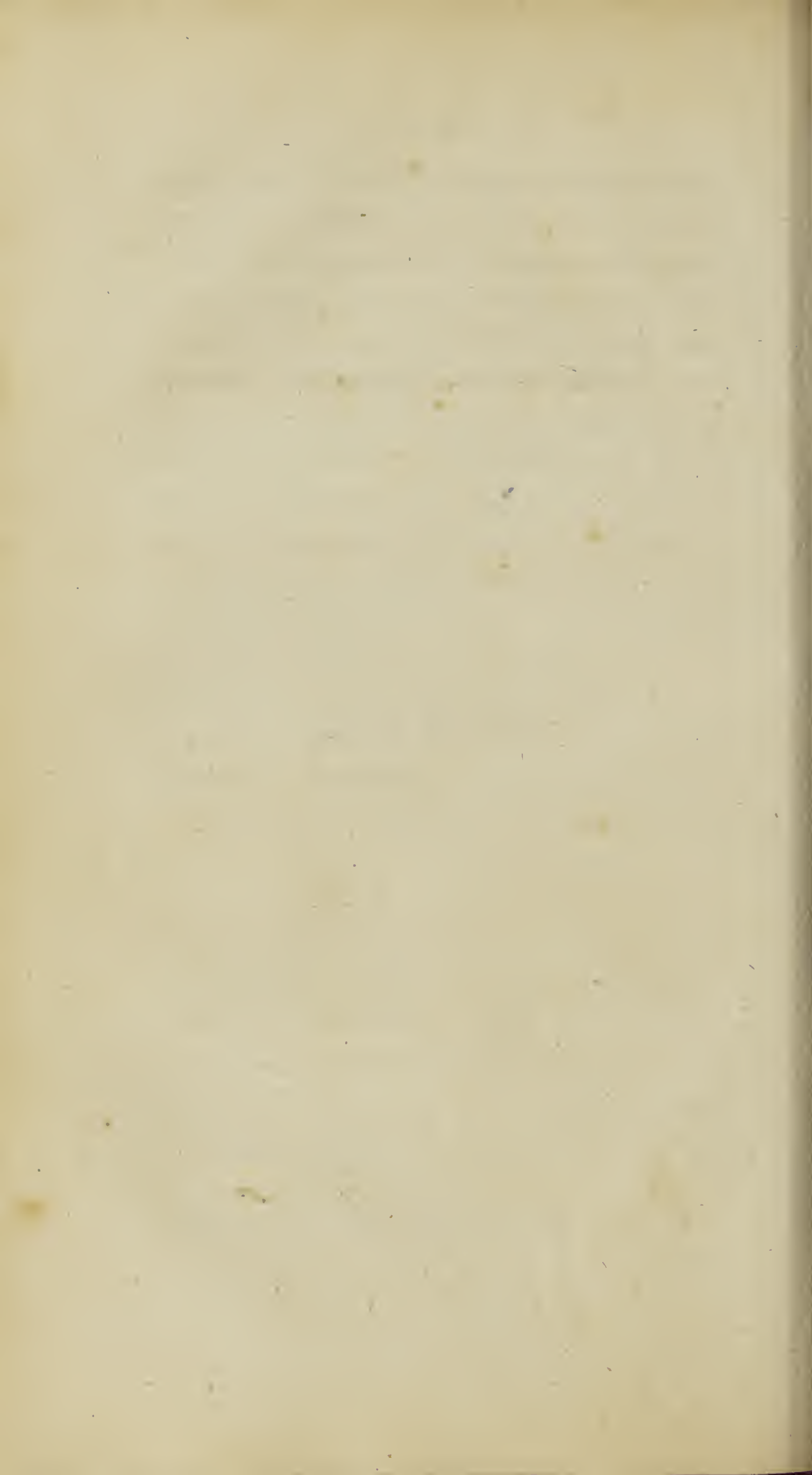
We shall here conclude our remarks on the use of the bark. A variety of other diseases, such as palsy, dropfy, hysteria, &c. might have been mentioned; but from what we have said, it will appear, that this remedy is properly employed in all diseases of direct debility: and we would wish it to be understood, that what we have advanced respecting the cinchona as a genus, may, as far as our own limited experience leads, be extended to that species which it is the peculiar object of this little work to recommend. Some of my readers may, perhaps, blame me, for having consumed so much time on one article of the materia medica; but I am persuaded, that I ought to apologize rather for the hasty manner in which these thoughts have been sent into the world, than for the attention bestowed upon a subject of such importance. Inaccuracies may occur, but a candid reader will readily overlook the imperfections in the intention of the author. “ Solent autem
 “ homines,” says the immortal Verulam,

* De Haen de Virtute Sing. quor. Med. cap. xxvii.

“ naturam

“ naturam tanquam ex præalta Turri, & à
 “ longe despicere, & circa generalia nimium
 “ occupari: quando, si descendere placuerit,
 “ & ad particularia accedere, resque ipsas
 “ attentius & diligentius inspicere, magis
 “ vera & utilis foret comprehensio.” Bacon,
 l. ii. cap. i.

T H E ‘ E N D.



AN
ESSAY
ON THE
METHOD
OF

Studying Natural History ;

BEING
AN ORATION

Delivered to the SOCIETAS NATURÆ STUDIO-
SORUM, at EDINBURGH, in the Year 1782.

By RICHARD KENTISH,
M. D. F. A. S. Ed. President of the Society, and Member
of several Literary Societies, &c. &c.

L O N D O N :

Printed for P. ELMSLEY, in the STRAND ; and
J. JOHNSON, in St. PAUL'S CHURCH-YARD.

MDCCCLXXXVII.

“ Look thro’ Nature, up to Nature’s God.”

POPE.”

TO THE RIGHT HONORABLE

Lord Viscount Mandeville.

MY LORD,

I FEEL myself happy in the permission of dedicating this little work to your Lordship; and I flatter myself that its object will not appear unworthy that attention which Natural History deserves, as a part of polite education. The study of Nature forms one of the most pleasing and instructive amusements of youth;—it is become the favored topic of Princes, and the great delight of scientific men.—It has opened to our view, in its varied pursuits, a wide and extensive field of observation and improvement.—It has aided the arts, and proved the basis of science.—Its utility has recommended it to all ranks of society; and I hope

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that

that the observations which are here presented to your Lordship will serve to facilitate an acquisition, which will prove a source of rational entertainment, and important information, throughout the various periods of that elevated station which your Lordship is destined to fulfil. And that you may imitate the engaging example of your illustrious parents, and emulate their noble virtues, is the earnest wish of

My Lord,

Your Lordship's most obedient,

Humble Servant,

RICHARD KENTISH.

Gower-Street, Bedford-Square,

June 7, 1787.

PREFACE.

P R E F A C E.

WHEN the professed intention of an Author is mere utility, the acquirement of much fame is precluded, and he ought to feel himself happy if he escapes without censure.—Such, in the present instance, is my own case.—I do not in this performance stand forth as the Champion of Discovery, or the Inventor of Theory.—An unexpected occurrence laid the foundation of this Discourse, and a peculiarity of events has induced its publication. In the course of my studies at the University of Edinburgh, I necessarily became engaged in the pursuits of Natural History, and I soon perceived that a connected view
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of the science, in our own language, was wanting. An occasion offered for my exertions, and I ventured to arrange my ideas in a summary view of the subject before a Society of Naturalists in the University.

It was the wish of several learned friends that I should present my arrangement to the public; but I rejected such solicitation, in hopes of perfecting my views:—professional engagements, and an almost total abstraction from literary pursuits during an annihilation of a triennial rustication, prevented me from such an undertaking. At length, however, I was tempted to review my theme, and I have only now to regret that it was not longer delayed. The additions which a country life afforded me to make were so trivial, that

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my work may still appear imperfect. But I am not without hopes that it may, notwithstanding, possess sufficient merit for the purpose to which it is designed.—By presenting to the young Student a systematic view of the most approved methods of studying the three kingdoms, or grand arrangements of Nature, with the best authors on each, my Work will be found to comprize a totality which is not (as far as I can learn) to be met with in our own language.—I trust, therefore, as a General Introduction, it may have its use; and I have reasons for its present publication still more urgent. Having engaged in a Course of Lectures on Chemistry and the Materia Medica, I am induced to present my pupils with this view of the Method of Studying Natural History, being fully convinced that no real progress

gress in either of these sciences can be made without such study.—It is on these arguments alone that I venture to present my Essay to the perusal of the candid reader.

GENTLEMEN,

GENTLEMEN,

I Cannot enter on the exercise of that office to which you have elected me, without thanking you for the honor which such a choice has conferred upon me. I now feel the want of those talents which I have so often admired in others. Oratory is an acquisition, which I now would wish to possess. But the art of speaking is not to be acquired in a moment: Nature has not been alike bountiful in her gifts of speech. To speak well in public assemblies is an accomplishment not dependant on the natural Powers alone. Custom and Habit give confidence to the speaker, and thoughts and words, like mechanical operations, are facilitated by use, and improved by culture. Eloquence, is not however the distinguishing mark of a philosopher; to think accurately,

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to speak justly and reason rightly, are objects of his attention. The flowers of rhetorick and the ornaments of speech he studies not. Though he admires them in others, he is apt to disregard them as useless and often prejudicial to philosophy. To improve the heart and instruct the head, are objects of his attention. You, Gentlemen, as a Society of Philosophers, will therefore, I trust, excuse the want of eloquence in your President; you will hearken to what he may say with readiness, and listen to the matter, regardless of the manner.

To thank you for the honor I have received is not sufficient; unprovided therefore as I am with a rich "wardrobe of words," unadorned as my argument may appear, I shall attempt to compensate for this defect by calling your attention for a few moments to objects worthy of your consideration. As an original Member of this Society,
you

you will pardon me, if I presume to lay before you the History of this now respectable Institution. Your Society, Gentlemen, dates its Origin from the year 1782. A year distinguished for the number of ingenious and learned men in this University. The Students were indeed not so numerous as at present, but the names of men, who that year adorned the List, and particularly assisted in the formation of this Society, will long be remembered with pleasure, and mentioned with respect.

A set of Gentlemen from various parts of the world, whose parental climes differed more than their Opinions, united for the purpose of mutual improvement in the different branches of Natural History. Botany, and Mineralogy were their chief pursuits, and to procure specimens of the different Plants, and Minerals, their intention. For this purpose they met, and unanimously went in quest of their respective

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objects.

objects. Having for sometime continued to amuse themselves in this manner, some circumstances occurred which made them desirous of meeting for the purpose of imparting their discoveries: accordingly they met at each others rooms, and each in his turn entertained the rest with his success in collecting. The most curious specimens were produced and the general opinions received. We did not long continue this mode of meeting before we attracted the notice of the most eminent Naturalists in Edinburgh. The Professors of the University, with that Liberality which marks their character, offered every assistance to our enquiries. The College Museum was tendered to our use, the Professor of Natural History entertained us with the choicest specimens of his cabinets, entered his name upon our list of ordinary members, and became a constant attendant on our debates: How great the improvement
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we now receive from such attention, you all know. After this Acquisition to our number, our fame went abroad, Gentlemen of the most distinguished Talents associated with us, our illustrious Professors of Chemistry and Botany took their seats in this Society, its attendant members increased, regulations were found necessary, and a Code of Laws, simple but efficient, were established. Every Member in his turn gave in papers for discussion, a *Calendarium Floræ* was kept, observations from different quarters were received, we were no longer a Society of young uninformed students, Gentlemen of the first abilities and distinction honored us with their remarks, and Nobility itself added dignity to our list of members. Such is the History of our first Session. In the year 1783 our meetings were fashioned into a regular Society, Officers were appointed, Presidents were elected, and our numbers increased.

increased. The present Session has confirmed the Utility of such an Institution; and I trust, Gentlemen, your foundation is now too firm ever to fall. When I reflect on the small beginning and rapid improvement of this Society, I cannot help congratulating its Members on the prospects before them. The histories of few societies rise with such rapidity towards perfection; the state you have now attained, and the number of illustrious Characters that adorn your List of Members augurs prosperity. Your Society, I presume to hope, will flourish, and its name go abroad. At this seat of science it will prove a fruitful seminary of natural knowledge, and as its Members disseminate they will spread its Fame. To attempt an eulogy on the objects of your meetings will appear superfluous, I must content myself therefore with saying a few words on the study of Natural History. Such
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of my hearers as are already advanced far on the scale of science, will I trust pardon the liberty I take in addressing myself to the younger Members of this Society. To them I would observe that Natural History now makes a part of polite education, and the man who is ignorant of it will frequently be deprived of one of the greatest sources of self-amusement.

It would be no difficult matter to shew the utility, sublimity and importance of that science which “ vindicates the ways of God to man,” but I trust that none of my hearers will stand in need of arguments or logical reasoning, to convince them of the rank which the study of nature holds amongst the sciences. Every branch of natural History is now become an important part of literature, it is cultivated by the highest orders of society, even Princes themselves have laboured in the extensive field
which

which it opens to their view, and their researches have been attended with success. The encouragement given to this study is of very ancient date.

Alexander the Great allowed Aristotle a considerable sum, to enable him to pursue this knowledge, and large sums of money have been expended in our own and other countries of Europe, in the formation of those collections which do honour to the taste of a refined people, and mark the munificence of an enlightened age. The attention of foreigners has been constantly attracted by these repositories of curiosities, and though the greater part of travellers are admitted but to gaze with wonder on the strange appearances presented to their view, yet to a philosophical enquirer, the effect is widely different. When he beholds the productions of different climates, and sees the varied form of nature; when he finds himself surrounded
with

with the inhabitants of different elements, and divers countries; when he traces the variety of species, and infinitude of products; when he examines the contrast in size and shape of animals, the wonderful œconomy of Vegetables, and the properties of the Mineral kingdom, he is led into a thousand speculations on the appearances of life, the methods made use of to sustain the living principle, and the wonderful extent, and diversity of organized and unorganized matter. The arranged collection of art is not however the source from which the greatest knowledge is derived. The whole system of nature is to the Philosopher a grand Muscum, and the properties of its contents the fit subject of his contemplation.

It is by such pursuits that the human intellect asserts its native dignity, and claims the ascendancy which it possesses. Every subordinate species
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of the animal creation acts contented in a lesser sphere, and performs the part assigned it with instinctive quietude, but man contemplates on the things around him, surveys, examines, and admires ; his capacity is adapted to complex enquiries, he is not satisfied with the bare inspection of facts, he marks effects, and dares to ask the cause. The aptitude of his mind is such, that the most complicated investigation is within the compass of his intelligence, and ideas the most abstract, are comprehended with simple facility. He tastes the pleasures of an imagination too fine for the gross conception of other animals, and pervades the secret paths of Nature.

To every order of society the study of nature cannot fail of being interesting ; it is in a peculiar manner connected with the avocations of some men ; it is the pedestal of philosophy, and the sole foundation of all
her

her discoveries. The practical professions of mankind are frequently inseparable from the study of nature. The science of Medicine is a striking instance of this kind; the connection is so intimate, that we find the names of physicians constantly enrolled amongst the most eminent naturalists. The sciences of Chemistry, Botany, and Anatomy, which form the most material branches of medical education, cannot be attained without a partial knowledge of Natural History; and although a minute acquaintance with the multiplied objects of each department is tediously laborious, yet a general one is easy, useful, and necessary to the character of a polite scholar. Without pretending to a minute knowledge of the subject, or wishing to arrogate more information than you are ready to admit, I will venture to beg your indulgence whilst I say a few words to those who may be entering on this pleasing study.

The whole diversity of organized and unorganized matter, which presents itself to our view in the external or internal parts of the Earth, has been comprehended by the Naturalists under three grand classes or divisions, which have been called the Three Kingdoms of Nature, viz. The Mineral, 2. Vegetable, 3. and Animal.

By the aid of these general, and some subordinate distinctions, which will fall under our consideration, the study of Nature is facilitated, the various appearances of bodies, which at first sight seem innumerable, are brought under our review, and we are enabled to characterize them by peculiar marks. It is to this classification that we are indebted for that comprehensive knowledge which we are able to attain, and that acquaintance which we possess with the animate and inanimate parts of the Creation. The methods which have been used for this purpose, are the
present

present objects of our attention. By detailing the principal systems which have appeared, I shall have an opportunity of remarking on the excellencies and defects of each, and be enabled to point out the proper guide for the conduct of beginners.

Mineralogy is that branch of Natural History, which falls first under our consideration. We shall view it in its most extensive sense, and by Minerals denote, not only such substances as are found in mines, as Metals, Semi-metals, Sulphur and Salts, but likewise all fossils that do not belong either to the Vegetable or Animal Kingdom. This study appears to be very ancient. The Jews and Egyptians in the time of Moses were acquainted with precious stones, and even the most rude and barbarous nations have been found to possess some knowledge of the ores of different metals. But it is only in modern times, amongst civilized and
learned

learned nations, that Mineralogy has assumed the form of a regular science. It is a branch of learning, whose cultivation and improvement requires both speculation and practice. Many nations in Europe have found it an object of political attention. In Sweden and Germany there are colleges in which it is regularly taught; it forms a distinct and honorable profession, like that of the divine, the physician, or the barrister, and its superior officers, form a part of the administration of the state. * The students are sent to foreign climates for the purpose of collecting rare and curious specimens. The Russians and Spaniards have lately adopted this plan, and the French have erected a Mineralogical School at Paris, to which a considerable stipend is annexed. Persons are employed in tracing subterraneous maps of the whole

* Kirwan's Elem. of Min. p. 28.

whole kingdom of France, and Mineralogical Voyages have been taken at the public expence. In our own country, which is allowed to be richer than France in mineral productions, the science of Mineralogy has received no encouragement from the public, and the study has been chiefly confined to a few Gentlemen of the Medical profession. Even Chemistry, which we shall attempt to shew, is the parent of Mineralogy, has been scarce attended to in England, whilst neighbouring nations have pursued it with enthusiastic ardour; it forms the favourite occupation, and even the most fashionable object of attention, not only of the middling, but even of some in the highest ranks of society. *

Before

* Among these says Mr. Kirwan, we may reckon in Russia, Prince Gallitzen: in Germany, Count Sickengen; in Italy, the Counts de Saluces, de Morozzo, and the Marquis de Gironi, Governor of Leghorn;

Before we detail the systems which have been professedly offered to the public, we should premise, that it has long been matter of controversy among the Naturalists, “ Whether the characters of minerals should be taken from external appearances only, or from their internal properties as discovered by chemical agents? If it be granted that every art and science should be founded on permanent principles, there can be no doubt but the latter opinion is founded in truth, and that the internal properties of minerals
are

Leghorn; in Geneva, Mr. de Saussure; in France, the Dukes de Chaulnes, Rochefoucault, and D'Ayen; the Counts de Lauraguais, la Garay, Milly, Treffan, and de la Tour d'Auvergne; the Marquisses de Courtenvaux, and de Courtivron; the Barons d'Olbach and de Servieres; Messieurs Trudaine, Lavoisier, Montigny, de Morveau; and among the Ladies, Madame la Presidente d'Arconville. To this List we may add the Earl Dondonald in Scotland, and Mr. Kirwan himself in England.

Kirwan's Elem. Min. Pref. iii. note.

are the only durable marks on which we can depend, in our researches on the unorganized, inanimate parts of matter. The study of Mineralogy therefore, necessarily requires the knowledge of the general principles of Chemistry, for which purpose I recommend to your attention, the Dictionary of Chemistry by M. Macquer, translated by Mr. Keir, whose notes are a valuable addition. The Chemical Essays of the Bishop of Llandaff, are valuable on account of their application to the arts ; whilst the Elements of Chemistry by M. Fourcroy, contain all that is necessary for a beginner to study as the rudiments of the science. The works of many eminent chemical philosophers, as Bergman, Scheele, Lavoisier, Morveau and others who have written singly, or published papers in the different Periodical Transactions or Memoirs of learned Societies, as those of the Royal Society of Lon-

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don, Academie de Science of Paris, Stockholm and Petersburg, &c. will give him great information. But the Dictionnaire de Chymie, now publishing by M. Morveau, in the Encyclopedie, is justly esteemed the first chymical work that ever appeared.

When a tolerable knowledge of Chemistry is once acquired, the study of Mineralogy will be easy ; for we assume it as an established fact, that no real progress can be made in this Science independant of such a foundation. The early Systems were in this respect defective. We shall take a short view of them.

The earliest system of which I have any account, was that of Magn. Bergarter Bromel, published in 1730. He arranges all Mineral substances under the following classes. 1. Terræ. 2. Salia. 3. Sulphura. 4. Lapides. 1 Igne persistentes. 5. 2 Calcinabiles. 6. 3 Igne Vitrescentes. 7. Figurati. 8.

8. Petrifacta. 9. Calculi. 10. Semi-Metalla. 11. Metalla.

There are many mistakes in this work, and its fundamental error is the want of Chemical knowledge in the author.

In 1736, the celebrated Linnæus, Professor of Natural History at Upsal in Sweden, published a System, in which he comprehends all Minerals under three classes. 1. Petræ. 2. Mineræ. 3. Fossilia.

The work is defective in many particulars, but from the minuté attention paid to species, may be useful for some purposes.

In 1747 J. G. Wallerius published a work which is in high esteem even at this day by many Naturalists. It is certainly useful for the study of species, but he has not availed himself of the aid of Chemistry. His divisions are, 1. Terræ. 2. Lapides. 3. Mineræ. 4. Concretæ.

In 1748, J. L. Woltersdorf sent into the world a system comprized under the following classes. 1. Terræ. 2. Lapidēs. 3. Salia. 4. Bitumina. 5. Semi-metalla. 6. Metalla. 7. Petrifacta. The last class is treated very fully, and as the branch is curious, it may afford instruction to those who particularly wish to pursue this part of Natural History.

In 1755, F. A. Cartheuser published a System of Mineralogy with the following divisions. 1. Terræ. 2. Lapidēs. 3. Salia. 4. Inflammabilia. 5. Semi-metalla. 6. Metalla. 7. Heteromorpha. Under the last class he includes the Petrifacta.

The System of J. H. G. Justus appeared in 1757, his divisions are, 1. Metalla. 2. Semi-Metalla. 3. Phlogistica. 4. Salia. 5. Petrificata. 6. Terrena. The work is said to treat copiously of the gems, but I have not been able to meet with it.

In

In 1758 an anonymous publication appeared, of which Linnæus says “Vox Swabii, manus Cronstedti.” He was right in supposing the work to be Cronstedt’s. Whatever aid Swab afforded is unknown. The system has been uniformly attributed to Cronstedt, and since published in his name. It is this work which laid the foundation of the present improved state of Mineralogy. But it is highly probable that the writings of some distinguished philosophers, as Mr. Margraaf of Berlin, and Mr. Pott, who about this time published his *Lithogenesis*, were in some degree the cause of the improvement which took place. This system was the first which introduced Chemistry as the basis of the science. His classes, and genera and species, are drawn from the composition and internal nature of minerals, but the varieties from external appearance only. By this means the advantages of both systems are combined.

The

The classes are 1. Terræ. 2. Salia. 3. Phlogistica. 4. Metalla. The work has been in general esteem with the chemical sect, and the student will find it of great use previous to his entering upon a minute investigation of species in the system delivered by Mr. Kirwan, whose researches place him far above the scale of ordinary writers. A system of six classes was published by Vogel, and a copious work on English fossils by Sir John Hill, but they do not appear to be worthy much attention. We ought however to remark, that not long ago some strenuous advocates have written in defence of the opinions which found the science on the external appearances of minerals only. Mr. Werner has written in the German language a Treatise on the external characters of Fossils, which is in high esteem. Mr. Romè de Lisle has likewise published a voluminous Treatise on the external forms of Chrystals, under which

which title he comprehends all those Fossils that are susceptible of a regular figure, which he imagines may be distinguished by the angles their plane make with each other, if there be no *heterogeneous matter* contained in them. The objections to this latter opinion are very obvious. There are many minerals which have no appearance of chry-
stallizations. There are likewise chry-
stallizations of no determinate figure, and the very form of chrystals often depends upon accident. Mr. Werner attempts to class minerals by the joint consideration of all their external properties; but that this combination of character is inadequate to the purpose will be apparent, by considering the mistakes which have happened in such a classification. So far from becoming acquainted with the nature of a mineral by such a superficial examination, we deceive ourselves, and may commit mistakes of serious consequence. We
may

may reject fossils of high value, or remain unacquainted with minerals which contain the most precious substances. The ores of metals are often only to be known by chemical tests. Mr. Werner has placed among the *Micas* a green foliated substance;* which being sent to Mr. Bergman, proved to be a compound of marine salt of copper, and argillaceous earth. So much superior is chemical experiment to bare enquiry, that this mistake was detected in so small a quantity as a single grain. Mr. Kirwan has placed the excellency of chemistry in a striking point of view, by examining the mutability of those external properties which minerals possess. And as it is impossible to set the matter in a clearer light than he has done, we shall take the liberty of adding an abstract of his observations, which will corroborate

* Kirwan p. vii Pref.

corroborate the opinion we have labored to establish. That *colour* is a very deceitful appearance, is manifest to every one who knows that white quartz, white lead ore, and white calcareous iron ore, have exactly the same snow white colour. There are likewise some species of the ores of iron, manganese, cobalt and copper, of the same iron-grey colour, whilst wolfram and blende are of the same brownish black, &c : a change of texture frequently produces a change of colour, thus a lump of cinnabar, which is *dark red*, will become of a beautiful *florid red*, by simply reducing it into powder.

Transparency and *opacity* are common to a great variety of very different substances.

Coherence and *hardness* are properties equally ambiguous. When a body is so hard as to strike fire with steel, it has been supposed to be pure flint

or siliceous earth, and this has been esteemed the most certain infallible test; but it is now known that well baked clay, and other substances, will exhibit this appearance.

Texture, in all its varieties, is common to substances widely different. Thus the fibrous is found in asbestos, shoerl, some varieties of gypsum, pyrites, pumice, antimony, hæmatites, malachite, cobalt, and arsenical ores; the scaly in mica, lead and iron ores &c. &c.

The varieties of *shape*, even when regular and determinate, are innumerable. Mr. de Lisle finds nine varieties in that of fluor, thirty-two in the shape of calcareous spar, fourteen in that of gypsum, sixteen in that of quartz, besides its monstrous forms, equally regular as the rest; nineteen in that of felt, spar, &c. The same specific substance is not only susceptible of various shapes, but various substances

stances specifically different, assume the same shape. The native calx of arsenic, blende, cinnabar and grey copper ore, appear often in a tetrahædal form; zeolyte, fluor, common salt, galæna, in a cubic, &c.

The form of saline substances has been thought most permanent, but Mr. Pott assures us, that microcosmic salt assumes the figure of almost all other salts, viz. nitre, vitriol, sal ammoniac, allum, Glauber's salts, &c.* Mr. Macquer discovered that corrosive sublimate chrySTALLIZED by cooling forms needles, but by mere evaporation cubes or lozenges.†

Many other instances might be given of the insufficiency of figure or shape for the perfect delineation of permanent mineral characters.

E 2

Specific

* Vid. IV. Pott, 49.

† Mem. Par. 1755, p. 540.

Specific Gravity is allowed to be one of the best external tests; but it frequently varies, by reason either of the different texture of the same species of mineral into whose interstices water cannot equally penetrate, or by reason of the greater proportion of some or other of the constituent parts, as is particularly observable in zeolytes, sparry or calcareous iron ore, and other fossils. Also, various substances specifically different, possess very nearly the same specific gravity.*

It now remains that we give an Account of the true method of studying Mineralogy, in doing which we are lead to speak of some excellent performances which have appeared in our own time; the *Sciagraphia Regni Mineralis* of Sir Torbern Bergman, Professor of Chemistry at Upsal, tended very much to the improvement of
Mineralogy,

* Vid. Kirwan's Elem. of Min. Pref. viii. ix. x. xi.

Mineralogy. It may be considered as a master-piece of the kind. His classes are four. 1. Sales. 2. Terræ. 3. Bitumina. 4. Metalla. These, he observes, are the most natural divisions. “ Fossilia,” says he, “ generatim quadruplicis sunt differentiæ vel enim salina, vel terrena, vel phlogistica, vel denique metallica indole gaudere reperiuntur. Hinc quatuor enascuntur Classæ.*”

He has introduced some new terms into the science which seem very expressive, and which have given rise to a happy choice of names affixed to species. Thus among the Sales Neutrales, their nature is designed by their appellation.

What was commonly called vitriolated tartar, is named alkali vegetabile vitriolatum, which shews at once the component parts of the compound.

The

* Bergm. Sciagr. Regn. Min. p. 20

The Glauber's salt is named alkali minerale vitriolatum. The use of such names is obvious to a Chemist. We immediately see that in the first example, the mineral is composed of the vegetable alkali united to the vitriolic acid ; in the latter, it is the mineral alkali combined with the same acid. Amongst the saline substances with an earthy basis, we likewise find the nature of the fossil expressed by its name. Epsom salt is named magnesia vitriolata, and alum, argilla vitriola. Amongst those with a metallic basis, the union is equally clear : blue vitriol is named cuprum vitriolatum ; white vitriol, zincum vitriolatum, &c. We are at first sight rather surpris'd to find the diamond arranged amongst the bitumina, or inflammable substances. Mr. Bergman proceeds on a fact published by M. Lavoisier in the Mem. de l'Acad. de Paris, and which has since been fully established. This precious
stone,

stone, which has by the common consent of all mankind been held in general esteem, is now found to possess properties peculiar to itself. When exposed to the focus of a strong burning lens, it is entirely evaporated under the form of vapor.

The great genius of Newton never shone more conspicuous, than in the minute observations which he made on this singular gem. In the second book of Optics, part iii. prop. x. we have a curious investigation of the properties, which unctuous and sulphureous bodies have in reflecting and refracting the rays of light, the words of the proposition are: “ If light be swifter in bodies than in vacuo, in proportion of the sines which measure the refraction of the bodies, the forces of the bodies to reflect and refract light, are very nearly proportional to the densities of the same bodies, excepting that unctuous and sulphureous

reous bodies refract more than others of the same density.

In the proof of this proposition, we are presented with a table, which is worthy the attention of every chemical philosopher, and as I do not know that it has ever been noticed in the works of Chemistry, I shall here take the liberty of offering it to the inspection of the reader. In doing this, it is but fair that I acknowledge my obligations to an ingenious friend, the Reverend Mr. *Stephenson*, Fellow of Clare Hall, who first pointed out to me the following passages.

T A B L E

T A B L E.

The refracting Bodies.	The proportion of the Signs of Incidence and Refraction of yellow Light.	The Square of B. R. to which the refracting force of the Body is proportionate.	The density and specific Gravity of the Body.	The refractive power of the Body in respect of its density.
A Pseudo Topazius, being a natural pellucid brittle hairy Stone, of a Yellow Colour - -	23 to 14	1,699	4,27	3979
Air - -	3851 to 3850	0,00052	0,00125	4160
Glass of Antimony	17 to 9	2,568	5,28	4864
A Selenitis -	61 to 41	1,213	2,252	5386
Glass Vulgar -	31 to 20	1,4025	2,58	5436
Chrystal of the Rock	25 to 16	1,445	2,65	5450
Island Chrystal -	5 to 3	1,778	2,72	6536
Sal Gemmæ -	17 to 11	1,388	2,143	6477
Alume - - -	35 to 24	1,1267	1,714	6570
Borax - - -	22 to 15	1,1511	1,714	6716
Niter - - -	32 to 21	1,345	1,9	7079
Dantzick Vitriol	103 to 200	1,295	1,715	7551
Oil of Vitriol -	10 to 7	1,041	1,7	6124
Rain Water - -	529 to 396	0,7845	1,	7845
Gumm Arabic -	31 to 21	1,179	1,375	8574
Spirit of Wine well rectified - }	100 to 73	0,8765	0,866	10121
Camphire - -	3 to 2	1,25	0,996	12551
Oil Olive - - -	22 to 15	1,1511	0,913	12607
Lintseed Oil - -	40 to 27	1,1948	0,932	12819
Spirit of Turpentine.	25 to 17	1,1626	0,874	13222
Amber - - -	14 to 9	1,42	1,04	13654
A Diamond - -	100 to 41	4,949	3,4	14550

“ The refraction of the air in this table, is determined by that of the atmosphere, observed by astronomers, for if light pass through many refracting substances or mediums, gra-

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dually

dually denser and denser, and terminated with parallel surfaces, the sum of all the refractions will be equal to the single refraction, which it would have suffered in passing immediately out of the first medium into the last. And this holds true, though the number of the refracting substances be increased to infinity, and the distances from one another as much decreased, so that the light may be refracted into every point of its passage, and by continual refractions, bent into a curve line. And therefore the whole refraction of light, in passing through the atmosphere, from the highest and rarest part thereof, down to the lowest and densest part, must be equal to the refraction, which it would suffer in passing at like obliquity out of a vacuum, immediately into air of equal density, with that in the lowest part of the atmosphere.

Now

Now by this table, the refractions of a Pseudo Topaz, a Selenitis, Rock Chryſtal, Iſland Chryſtal, Vulgar Glaſs, (that is, ſand melted together) and Glaſs of Antimony, which are terreſtrial ſtoney alcalizate Concretes, and *air, which probably ariſes from ſuch ſubſtances by fermentation*, though theſe be ſubſtances very different from one another in density, yet they have their refractive powers almoſt in the ſame proportion to one another, as their densities are, excepting, that the refraction of that ſtrange ſubſtance, Iſland Chryſtal, is a little bigger than the reſt: And particularly Air, which is 3,400 times rarer than the Pſeudo-Topaz, and 4,200 times rarer than Glaſs of antimony, has, notwithstanding its rarity, the ſame refractive power in reſpect of its density, which thoſe two very denſe ſubſtances have in reſpect of theirs, excepting ſo far, as thoſe two differ from one another.

Again, refraction of the Camphire, Oil Olive, Lintseed Oil, Spirit of Turpentine and Amber, which are *fat and sulphureous unctuous bodies, and a diamond, which probably is an unctuous substance coagulated*, have their refractive powers, in proportion to one another as their densities, without any considerable variation. But the refractive powers of these unctuous substances, is two or three times greater in respect of their densities, than the refractive powers of the former substances in respect of theirs."

For the remaining part of the observations, which are well worthy the attention of a Chemist, we must refer to the work itself, without which, the whole of the table here given, cannot be understood

The work of Mr. Kirwan has no rival. It possesses the singular advantage of combining the excellence of preceding writers with many new discoveries.

coveries. The author has availed himself of the labors of others, and labored much himself.

The *Sciagraphia Mineralis* of Mr. Bergman has been of great use to him, and Mr. Kirwan acknowledges that it was, “ by the solidity of his judgment, the ingenuity and accuracy of his methods, and the multiplicity of his experiments, that Mineralogy was brought to that degree of perfection at which we at present behold it.” The writings of Margraaf of Berlin, and the discoveries of Brandt, Swab, Gahn, and Scheele are all made subservient to this system. The classes of our author are the same as those of M. Bergman. 1. Earths and Stones. 2. Salts. 3. Inflammable Substances. 4. Metallic Substances. He takes the character of his Classes, Genera and Species, from the nature of their internal composition; but the varieties are described from their external appearance

pearance only. Thus among the Earths

CALCAREOUS GENUS,

Species I.

Calcareous earth, uncombined with any acid.

Species II.

Combined With the aerial acid.

Series I.

Transparent spars.

Series II.

Opake.

In this instance we see the Genus is first mentioned according to its chemical nature. The Species is likewise chemically described, together with such a description of the external qualities as can be of service to assist the Naturalist. Thus the first species is said

said to be “ a stone of a grey colour, moderately hard, or rather soft, found near Bath ; it is mixed with calcareous earth combined with fixed air ; and hence it effervesces with acids, but at the same time it is soluble in water, to which it communicates the taste of lime ; and if this solution be mixed with sulphur it dissolves it, and forms a calcareous liver of sulphur, with the assistance of heat, whence it is plain that part of the calcareous earth is in an uncombined state.” Here we have a description of the appearance as it most commonly occurs, but a certain knowledge of the matter can only be gained by Chymical experiment. In the two species again we know, that they “ all effervesce with acids ; none give fire with steel ; and the chrySTALLIZED decrepitate when heated.” The most remarkable varieties of external appearances are comprehended under the two series of, 1. Transpa-
rent,

rent, 2. Opake. In the first series they are called Spars, and these are mentioned to be found in various forms, as rhombodial, hexangular, triangular, polyangular. Their specific gravity is likewise commonly noticed, and Mr. Kirwan is particularly minute in giving an exact chymical analysis of the mineral, wherever it can be done.

The science of Chymistry is indeed eminently conspicuous in this particular analysis, and has been carried to great extent: not only the common minerals, but even the precious stones have been analyzed by the indefatigable Mr. Bergman. We shall here subjoin an abridged view of one of the tables given by Mr. Kirwan, with some amendments from the second vol. of Bergm. Opusc, Chen.

TABLE

T A B L E III.

Of the proportion of ingredients in
Earths and Stones.

Calcareous Genus.

100 Parts.	Calcar.	Argill.	Silex.	Magn.	Water	Iron.
Calcareous Spar	53	—	—	—	11	a
Gypsum -	32	—	—	—	38	b
Fluor -	57	—	—	—	—	c

a. And 34 Fixed Air. b. and 30 Vitriolic Acid. c. 43 Acid
and Water.

Siliceous Genus.

100 Parts.	Silex.	Argill.	Calcar.	Magn.	Iron.
Chrystal - -	93	6	1	—	—
Flint - . -	80	18	2	—	—
Jasper - -	75	20	—	—	5
Ruby - -	39	40	mild 9	—	10
Hyacinth -	25	40	D ^o 20	—	13
Topaz - -	39	46	D ^o 8	—	6
Emerald -	24	60	8	—	6
Sapphire -	35	58	5	—	2
Garnet - -	48	30	12	—	10

What has been said will give a
tolerable idea of the present improved
state of Mineralogy, and it must ap-

pear sufficiently obvious, that there can be no comparison in the methods to be adopted for its attainment. A superficial dabler in the study of Nature, may amuse himself by collecting and arranging multitudes of Minerals, which may in reality be mere varieties of a few Species, whilst the more enquiring Naturalist will labour to attain real knowledge, and wish to possess those facts which lead him to an exact discrimination of the objects of his pursuit.

When a tolerable knowledge of Mineralogy is acquired, the philosophic Naturalist will receive great amusement from a variety of geological observations on the antiquity and origin of Mountains, their height, and the means of determining it by means of the Barometer; — their internal structure; — the nature of Volcanos and their productions, &c.

Those

Those who wish to make themselves more particularly acquainted with the Theories that have been published respecting the formation and structure of the World, will find great information and amusement from the “*Lettres Physiques et Morales*,” par M. de Luc, where the Theories of Burnett, Whiston, Woodward, Leibnitz, Scheuchzer, l’Abbè Pluche, Le Catt, Telliamed, Lazzaro Moro and Buffon are detailed. Mr. Forster’s Observations, the *Amœnitates Academicæ* of Linnæus, and several other Works, will likewise be found exceedingly useful on this and other branches of Natural History. We shall here cease our account of the method to be preferred in studying the inanimate parts of Matter, and proceed to treat of organized bodies, as they appear under the forms of Vegetable, or Animal Life.

P A R T II.

The Vegetable Kingdom.

IN studying the appearances of matter under the organised form of vegetables, many curious observations present themselves to the eye of a philosopher. Their structure, habit, propagation, and several other physiological questions, equally interesting and important, occur to the naturalist; whilst their number, diversity, and other peculiar circumstances, attract his attention. It is not our business in this place to indulge the speculations of enquiry, or descant on the beauties of this field of nature. We must content ourselves with such observations as may yield instruction to the uninformed,

formed, and teach them how to tread the splendid path of flowers. From the earliest period of time some attention seems to have been paid to the vegetable kingdom. The food of the rude inhabitants of every country is commonly derived from plants. The most barbarous nations are found to possess some knowledge of the use of vegetables. It is therefore to be presumed, that, long before history conveys intelligence, the study of mankind was particularly turned towards this part of the beauties of nature. We learn from Holy Writ, that Solomon was far advanced in the science of Botany. He is said to have written on the subject; but neither his writings, nor those of Anaxagoras, nor Pythagoras, have been handed down to us. Theophrastus, the disciple of Aristotle, in the third century before the Christian æra, published a work, entitled, “ The History of Plants,” which,

which, I believe, is the earliest legend that this subject boasts of. In it he treats of the origin, propagation, anatomy, and construction of vegetables, of vegetable life, and of vegetation. It was near four hundred years after this publication, that Dioscorides distinguished himself as an eminent botanist. Pliny, in the amplitude of his natural pursuits, glanced at the vegetable creation; but he does not appear to have entered deeply into the subject, and many ages elapsed before this branch of knowledge assumed the regular form of a science. At length the time arrived when the necessity of system became apparent. A serious attention convinced the botanists that the kinds and species, even of locality, were too numerous for the memory to retain without arrangement. The methods which were chosen are very different; and the young student will be surprized to find, that even at the present

sent day, philosophers are unacquainted with a system wholly unexceptionable. The method of arranging plants alphabetically was much followed, especially in local catalogues. Pauli, in his *Quadripartitum Botanicum*, published in 1639, has disposed them according to the *time of flowering*. Besler, in the *Hortus Eystettenfis*, 1640; and Dillenius, in the *Catalogus Giffensis*, 1719, have followed this method. Others have arranged them according to the *different places of their growth*, as the authors of the *Historia Lugdunensis*, in 1587; and some according to their virtues in medicine. Others who observed that many vegetables agreed with each other in certain particulars, have endeavoured to take these peculiarities as the leading character of their systems. Thus the harmony or proportion in the form and disposition of their roots, leaves, flowers, or fruit; the particular mode of growing, flowering,

ering, or foliation; has given rise to classes agreeable to such distinctions. Hence the division of trees into pomifera, nucifera, baccifera, prunifera, glandifera, &c. : of herbs into bulbosæ, filiquosæ, umbellifera, verticillatæ, papilionacæ, &c. These are classes or orders which Nature herself has instituted, and it is the grand desideratum of botany to reduce, and connect all vegetables according to such a *natural method*. In this point, however, the most sanguine endeavors of the naturalists have hitherto proved ineffectual. John and Caspar Bauchine, in the last century, pursued this plan. Gerard and Parkinson followed their example, but as they established no precise definitions to their classes, and were not accurate in the minuter parts of their system, their classification proved exceedingly imperfect.

Conrade Gesner, a distinguished naturalist, who died in 1565, seems to have

have been the first who pointed out the method of classing plants from the flower, or fruit; but he did not pursue the idea so as to fashion it into a system. Cæsalpinus, physician to Pope Clement VIII. was the first author who arranged vegetables in a true systematic manner. In his *Libri de Plantis*, published in 1583, he endeavors to establish the character principally *from the fruit*, but a great length of time elapsed before his plan was wrought into a system. Morrifon and Ray published their separate systems nearly together, in which their characters are principally taken from the fruit. Several authors of eminence have attempted to perfect their labors, as Knaut in Germany, Paul Herman and Boërhaave in Holland, and Dillenius, professor at Oxford. The flower was first taken as the foundation of the classical character by Rivini, at Leipzig, in 1690. The regularity and irregularity, as

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well

well as the number of the *petals*, have been made the principal distinction. Tournefort, in 1694, carried this method to very great perfection. He forms the character of his classes from the figure of the flower, and establishes his orders or subdivisions on the different situation of the fruit, whether above or below the empalement or receptacle. Ruppius, in 1718, likewise took the flower as the foundation of his method. Several attempts have been made to arrange vegetables according to what are called natural classes; the foundations of which comprehend a variety of characters arising from a combination and agreement in the *habit* of plants, and their *harmony* in the essential parts of fructification, as we have before noticed. Van Royen, late professor at Leyden, is author of the most elegant system hitherto published on this plan. It is exhibited in the *Prodromus Floræ Leydenensis*,

sis, 1740, and together with that of Cæfalpinus, Tournefort, and Ray, comprises the whole of the Systematists with which my late worthy friend and præceptor, Dr. Hope, thought it necessary for his students to be acquainted, previous to their entering upon the Linnæan system.*

Haller has given a method resembling that of Van Royen, which is brought to great perfection in his *Enumeratio Stirpium Helvetiæ*, 1742. *Hortus Gottingensis*, 1753, and *Historia Stirpium Helvetiæ*, 3 tom. fol. 1768. Gmelin, in the *Flora Sibirica*, 1747, followed nearly the same plan; and L. Gerard, in his *Flora Gallo-Provincialis*, Paris, 1761, preserves very nearly the natural generical characters of Linnæus, taking the orders of a *natu-*

* Vide Dr. Hope's useful little work, entitled, *Genera Plantarum in Usus Academicos*. *Edinb.* 1780.

ral method, constructed by B. Jussieu, for his classes.

Among the systematic writers, Linnæus has enumerated no less than twenty-eight; but as it would be tedious to pursue this part of our subject any farther, we shall proceed to detail that system which is now the most universally received and admired.

Charles Von Linné, or (as he was commonly called) Linnæus, was the son of a Swedish Divine, and born at Roeskult, in the province of Smaland, in Sweden. There is something botanic in the very name of Linnæus; for the ancestors of this family are said to have taken the surnames of Linnæus, Lindelius, and Tiliander, from a large lime-tree, or linden-tree, yet standing on the farm where this naturalist was born. Such an origin of surnames is not uncommon in Sweden. After struggling with the difficulties of adverse fortune, this
great

great man arrived at honor and independence. He was made Professor of Physic and Botany in the University of Upsal, Physician to his Sovereign, and Knight of the Order of the Polar Star. In 1757, he was ennobled, and on the resignation of his office had his pension doubled, and a liberal donation of landed property settled on him and his family. He died January 11, 1778, aged seventy years and eight months. It is, however, foreign to our purpose to pursue the biography of any naturalist. The distinguished eminence of Linnæus can alone excuse the present digression.* We shall therefore return
to

* On the death of Linnæus a general mourning took place at Upsal, and his funeral procession was attended by the whole University, as well professors as students; and the pall supported by sixteen Doctors of Physic, all of whom had been his pupils. The King of Sweden paid the highest honors to his memory, He ordered a medal to be struck, of which one side exhibits Linnæus bust and name, and the other Cybele,
in

to give a sketch of the botanic system of this great man.

Linnaeus

in a dejected attitude, holding in her left hand a key, and surrounded with animals and growing plants, with this legend—*Deam lucius angit amissi*,—and beneath—*Post Obitum Upsaliæ, die x Jan. MDCCLXXVII, Rege jubente.*—The King likewise was present at the meeting of the Royal Academy of Sciences at Stockholm, when Linnaeus's commemoration was held; and in his Speech from the Throne to the Assembly of States, he paid a tribute to this great man's memory, by lamenting the loss of Sweden in his death. The benevolent and distinguished Professor of Botany at Edinburgh, at the opening of his Lectures in 1778, pronounced an eulogium in honor of Linnaeus, and perpetuated, by an elegant compliment, the fame of this naturalist, together with his own name. He laid the foundation stone of a monument in the Botanic Garden, consisting of a vase supported on a pedestal, with this inscription,

Linnaeo

posuit

J. Hope.

This very worthy man, whose death is sincerely lamented by all who knew him, has left behind him another instance of his peculiar attention to merit, in whatever rank of society he found

Linnæus very early attempted a natural method of arrangement ; but he soon found that too many links are wanting in the chain to render it the readiest guide to botanical science. He only reduced the genera into orders, but did not venture to form the classical part of a system on that plan. He made an attempt to fix the *calyx*, or *cup* of the flower in plants, as a source of arrangement, in which he seems to have followed Professor Magnol, of Mont-

found it. In a shady and retired part of the same garden is raised a monument to the memory of a faithful servant, who discharged the duties of his office as a Gardener with fidelity and credit. The man, who, in the midst of various occupations which science and medical practice occasion, could give attention to the perpetuity of merit, will not, it is hoped, himself soon sink into oblivion. A select publication of such manuscripts as the Professor has left behind, could not fail of being a valuable acquisition to the botanic world. The progress which he had made in a natural method will prove to him
 “ Monumentum ære perennius.”

Montpelier, who published in 1720.* But he soon rejected all these methods, and was the first who constituted the stamina and pistils, as the basis of an artificial method of arranging plants. He was led to this by considering the great importance of these parts in vegetation. He maintained, that they alone are essential to fructification, since all other parts, except the *anthera* and *stigma*, are wanting in some flowers. The present philosophy of botany regards the former as the male, and the latter as the female organs of generation in plants. From this distinction of the sexes of vegetables, the arrangement of Linnæus is known by the name of the Sexual System. It consists of twenty-four classes, and their characters are established upon the number, situation, or arrangement of the stamina, or male organs. The or-
ders

* Vide Pulteney's View of Linnæus's Writings, p. 116.

ders or subdivisions of these classes are, as far as possible, drawn from a similar number, situation, or arrangement of the pistils, or female organs. In the first twenty classes are contained such flowers as have the stamina and pistils both within the same cup or petals, or standing on the same receptacle where these are wanting. The author calls them hermaphrodite: as according to his doctrine there are both male and female parts in the same flower.

The first ten classes proceed in an uninterrupted series, from Monandria to Decandria; the plants of each having as many stamina as the title expresses; thus, 1. Monandria, Stamen unicum in flore hermaphrodito. 2. Diandria, Stamina duo in flore hermaphrodito. 3. Triandria, Stamina tria in flore hermaphrodito, &c.

The eleventh class is Dodecandria, Stamina duodecim in flore hermaphro-
I
dito.

dito. For it is very remarkable, that no plants yet discovered have exactly eleven stamina.

The twelfth, Icosandria, containing such plants as have about twenty stamina, or more, arising from the *calyx*, or *corolla*, and not from the receptacle.

The thirteenth, Polyandria, may have the same number of stamina as the former, but they arise from the *receptacle*, and are commonly very numerous.

The fourteenth class, Didynamia, comprehends such plants as have four stamina, two long, and two short. This includes vegetables of a very particular description, the essential character of which does not consist in the number, but size and peculiar form of the stamina, two of which are uniformly shorter than the other. The corolla is irregularly shaped, and there is only one pistil.

The

The fifteenth, *Tetradynamia*, includes plants with six stamina, four of which are longer than the other two.

The sixteenth, *Monadelphia*. In this the stamina are not distinct at the base, but united into one body.

The seventeenth, *Diadelphia*, in which the stamina are united at the base into two bodies.

The eighteenth, *Polyadelphia*. In this the stamina are united at the base into several bodies.

The nineteenth, *Syngenesia*, in which the antheræ unite together so as to form a tube or cylinder, through which the pistil commonly ascends.

The twentieth, *Gynandria*, in which the stamina proceed from the pistil, and not the receptacle.

The twenty-first, *Monoecia*; such as have separate male and female flowers on the same plant.

The twenty-second, Dioecia such as have separate male and female flowers on separate plants.

The twenty-third, Polygamia. In this class, besides the hermaphrodite flowers, there are others, either male or female, in the same plant.

The twenty-fourth, Cryptogamia. In which are contained those plants, the mode and organs of whose fructification are not yet sufficiently ascertained. They have been called imperfect plants, and it may justly be said of them, “*Parvitate oculos nostros subterfugiunt.*”*

The

* It was rather from conjecture than proofs, that Linnæus instituted the class of Cryptogamia. He reasoned from analogy, and late writers have given proof of the truth of his supposition. Some time ago Micheli asserted, that he had observed the real stamina and pistilla in Mosses; but his observations were neglected, and scarcely credited, 'till the accurate Dr. Hedwig, of Leipzig, published his history of Mosses in 1782, in which he has demonstrated the parts of fructification of several Mosses, and illustrated the structure and œconomy of

The orders of the system are for the most part taken from the number of the pistils, or female parts. Thus in the first thirteen classes, in which the classcal character depends uninterruptedly on the number of stamina, the orders depend likewise on the number of pistils; but when situation or different arrangement takes place, they are most commonly founded on other distinctions. Thus the Didynamia has the

two

of these minute plants in a very complete manner. He proves that the capsula of Dillenius, (the anthera of Linnæus) which both those authors considered as producing the impregnated pollen, is in fact the fruit, and the powder which it contains the seed; and that the male flowers are what Linnæus and others took for the female. This was suspected by the celebrated Schreber, and the opinion is now adopted by all scientific botanists. Dr. Hedwig has prosecuted his enquiries in other orders of the Cryptogamia; and in a prize dissertation, published at Petersburg, which has not yet reached this kingdom, he has illustrated the fructification of the Filices, Algæ, Musci, and Fungi, in thirty-seven plates. For an Abstract of his Discoveries, vide Smith's Translation of Linnæus's Dissertation on the Sexes of Plants, p. 59, 60, 61, 62.

two orders of Gymnospermia and Angiospermia: the former having four naked seeds, and the latter having the seeds inclosed in a seed vessel. In the Tetradynamia, the two orders of Sili culosa and Siliquosa are taken from the size and shape of the pod or shale; in the former of which it is short, and in the latter long. In the classes of Monadelphica, Diadelphica, and Polyadelphica, the orders are formed from the number of the stamina. In the Syngenesia class there are two general subdivisions or orders, Polygamia and Monogamia; the first of which is divided into five lesser divisions, as Polygamia, Æqualis, Superflua, Frustranea, Neceffaria, Segregata. The differences here arise from the different structure or sex of the Floscules, constituting the whole flower.

In the Gynandria, the orders are taken from the number of the stamina,
as

as in the sixteenth, seventeenth, and eighteenth classes.

In the Monoecia and Dioecia classes, the characters of the orders are drawn from the characters of the foregoing parts of the system as far as to the Monoecia class itself; the first order of which contains Monandrous, and the last order of the *Diocoeia* Gynandrous plants.

The orders of the Polygamia contain the Monoecious, Dioecious, or Trioecious plants. The orders of the Cryptogamia class are Filices, Musci, Algæ, and Fungi.

It will be unnecessary to pursue this system any farther. From what has been said, a general idea may be formed of its principle; and as it is now almost universally received, we may venture to recommend it to the serious attention of those who wish to make any progress in the science of Botany. The great difficulty of this study consists in acquiring the various terms which

which serve for the description of the different parts of plants. It is therefore necessary that the young student be furnished with some guide on this subject. The most useful works with which I am acquainted are Lee's Botany, and the Elements of Botany, by Mr. Rose, an ingenious Apothecary, who has given a translation of Linnæus's principal Observations in support of the Sexual System. From these books alone, considerable progress may be made in Botany; but it is from the writings of Linnæus only that we can derive a full and complete knowledge of the vegetable creation. His Genera and Species Plantarum, together with the Supplement published by Young Linnæus, are indispensably necessary to the Botanist.* The Philosophia Botanica is a
work

* These works are lately translated into English by a Society at Litchfield; but the performance (however laudable the attempt) falls short of the original, and serves to convince
us,

work of great utility, and together with a little Essay, entitled, “ A Dissertation on the Sexes of Plants,” translated from the Latin of Linnæus by my worthy friend Mr. Smith, one of the original members of this Society, forms a very happy illustration of the doctrine on which our author founds his system. The Botanic Letters of Rousseau, lately translated, with additions, by Professor Martin, of Cambridge, will afford amusement and instruction to the young Botanist, whilst the plates which have been published by a variety of authors, and executed by many eminent artists, will have the happy effect of conveying entertainment and improvement. The first botanic plates of which I have received any account are those of Gefner, which, though on

us, that no real progress can be made in Botany, or, perhaps any of the sciences, without a tolerable knowledge of the Latin Tongue.

wood, were very useful in their day, as well as those of Rudbeck, Ferrarius, Dordartius, and Rhædius. The first copper-plates of plants were published by Columnna, which, together with those of Rivinus, Dillenius, Sir Hans Sloane, and Sir John Hill, form very useful additions to the Botanic library. The latter has confined his delineations to the English plants; but his work is far surpassed by the very elegant and splendid plates of Mr. Curtis, an apothecary in London, whose performance is an honor to the age which produced it. The learned President of the Royal Society, Sir Joseph Banks, who is justly esteemed and distinguished as the most eminent naturalist in this or any other country, is completing a set of plates, which for utility and elegance surpass every thing of the kind. They present to the Botanist well-finished representations of such plants as he may never have an opportunity of beholding.

ing. The elegant engravings in Mr. Forster's Observations, a work which we have already recommended, ought likewise to be mentioned as worthy the attention of those naturalists who are desirous of being acquainted with the curious productions of the vegetable world in the South Seas.

In such an extensive field as that of Botany, it often happens that the genius or particular views of one man incline him to cultivate with peculiar ardor a particular part. In such case it may be of use to know, that several authors have distinguished themselves in respective departments. Thus Morison and Artedi excel in their accounts of the Umbelliferous plants. Ray, Montius, Scheuchzer, and Michelius, are the esteemed writers on the Gramina; Dillenius on the Mosses; and both the latter likewise on the Fungi.

The anatomy and physiology of plants have been accurately treated by

Malpighi, Grew, Hales, Gesner, Feldman, and Ludwigijs. The virtues of plants have been copiously treated by many writers on the *Materia Medica*. No subject, indeed, has been more discussed, and worse treated. The wildest conjectures have been assumed as facts, and qualities the most imaginary have been attributed to vegetables, and their various parts. It has been the business of medicine in the present age to consign to oblivion many plants formerly supposed to have specific powers. To those who may occasionally desire to turn their attention to this matter, I would recommend Dr. Alston's *Lectures on the Materia Medica*, published by Dr. Hope, which, with Lewis's *Dispensatory*, form a system of vegetable medicine, sufficiently accurate for the purposes of common enquiry. The work of Geoffroy was formerly in great repute, and does still deserve attention, for the chemical analysis which he
gives

gives (however imperfect) of several plants. In the systems of *Materia Medica* by Murray, and Bergius, Professor at Stockholm, we have arrangements according to the Linnæan method, highly useful to medical men. And the *Materia Medica* of Dr. Cullen is perhaps the most philosophical view that was ever given of this subject. The *Amœnitates Academicæ*, which consist of a Collection of Theses in 7 volumes, in 8vo. published under the inspection of Linnæus, contain many valuable observations on every branch of Natural History. Dr. Lewis's *Commerc. Technic. or Philosophical View of the Arts*, is a work which deserves to be mentioned in this place, as highly useful to the Naturalist and Philosopher. The plants of particular countries have likewise their particular historians. Those of Lapland have been explored by Linnæus; of Prussia, by Læfilius; of

of Paris, by Vaillant; England, by Ray, Sir John Hill, Hudson, Curtis, &c. and of Scotland, by Lightfoot.*

We shall here close our account of the method of studying the vegetable kingdom; and we trust, that what has been said will be sufficient to excite the attention of the young student, as well as to afford him some instruction.

We have endeavoured to give the outlines of this branch of study: for as general information must necessarily be premised before particular knowledge can be attained, we trust, that it will appear no small progress to have acquired, at one view, some acquaintance with the various authors of an enlarged and comprehensive subject.

* Vide Linn. Phil. Botan.

P A R T III.

The Animal Kingdom.

WHEN we take a view of the number of animals which exist in every part of our earth, we shall be ready to acknowledge, that it must be matter of real difficulty to attain a tolerable acquaintance with them. The appearances of nature are not immutable. Many of her external forms are fugitive, and it is only by serious attention, and minute investigation, that we can fix upon points which she has characterized indelible.

When such characteristic marks are once discovered, we may proceed to system, and attempt the classification even of infinitude. Multiplicity will no longer constitute difficulty. It is by method
that

that we facilitate study, and in matters of natural science, we are at liberty to borrow artificial aid. I shall therefore mention some of the principal methods which have been offered to the public, and conclude with an enumeration of the principal authors in each branch of the science.

Aristotle was probably the first who ever thought of arrangement in this subject. He established only general and simple divisions; but his excellent reflections on the external and internal organs of animals, laid a foundation upon which the classifications of the first methodical naturalists, as Gesner, Aldrovandus, Johnston, Charleton, Ray, &c. have been founded.* A great number of other naturalists, whom

* In 1693, Mr. Ray published his *Synopsis Method. Animalium, Quadrupedum, & Serpentini Generis*. His two general divisions are into *Quadrup. ungulata*, or hoofed; and *Quadrup. unguilata*, clawed or digitated.

whom we shall have occasion to mention hereafter, have enriched Natural History by their observations: but it was left to the sagacity and penetration of Linnæus to fix upon a method of characterizing all living bodies. His system is undoubtedly liable to many exceptions; but it is easier to find fault than to amend. In the year 1735, Linnæus first published the system, of which we shall attempt some account. After taking a philosophical view of the subject in general, he proceeds, in Vol. I. of the *Systema Naturæ*, to the establishment of the classical characters, from the different internal structure of animals. By this natural division all the animal kingdom naturally divides itself into six classes, as follow:

Animals with the heart furnished with

Two ventricles and auricles:	} Viviparous.	Mammalia.
Blood warm and red		
	} Oviparous.	Birds.
	L	One

One ventricle and auricle :	} Respiration } voluntary. }	Amphibia.
Blood cold and red.	Breathing by gills.	Fishes.
One ventricle without auricle :	} Antennated. Insects. } Tentaculated. Worms.	
Sanies, cold and colourless.		

To this account of the internal structure the author adds all the differences arising from the lungs or other organs of respiration, from the maxillæ, jaws or mandibles, organs of generation or sensation; the teguments, or outward covering, and the fulcra, or legs, wings, &c. At the head of each class is given a concise description of the classical character, including an explanation of the terms belonging to the class. We have likewise a general enumeration of the best authors on each; a part of the work exceedingly useful to students, and from which we shall occasionally borrow, in our view of the method of studying this part of the creation.

CLASS

CLASS I. MAMMALIA.

Comprehends all those animals which we call quadrupeds, (except the lizard genus, or reptiles pedati, as they are called) and likewise the cetaceous order, or whales, cachalots, and porpoises. Several authors have dissented from this arrangement of whales with quadrupeds, and the author had separated them in the first edition of his *Système Naturæ*; but upon reflection he thought himself justified in such a classification. The striking particulars in which they differ from fishes, as the structure of the heart, having lungs for respiration, moveable eyelids, being viviparous, and furnished with teats, all incline him to refer them to this class. The single circumstance of living in the same element is therefore overlooked.

The mammalia are divided into seven orders, which are principally taken from the difference in the number, situation, and form of the three kinds of teeth with which animals are endued, viz. the *primores* or *incisores*, called the fore-teeth or cutting-teeth; the *laniarii* or *canini*, dog teeth, canine, or lacerating teeth; and the *molares*, grinders, or double teeth. Our author likewise takes into consideration the feet, as will appear from the following view of the orders.

I. Digitated.

Fore teeth, four.	Canine		
single,	-	-	Primates. 1.
Fore teeth, none	-	-	Bruta. 2.
Fore teeth, 6, 2, 10 conical.			
Canine single	-	-	Feræ. 3.
Fore teeth, two.	Canine		
none	-	-	Glires. 4.

II. Hoofed.

No fore teeth above	Pecora. 5.
Fore teeth above and below	Belluæ. 6.

III. De-

III. Destitute of Hoofs or Claws.

Teeth, various in the diffe-

rent genera - Cete. 7.

We shall here detail the characters as they stand at the head of each order.

I. Primates. Animals furnished with fore teeth, or cutting teeth: four above; parallel. Two pectoral teats.

II. Bruta. No fore teeth.

III. Feræ. Six sharp fore teeth in the upper jaw. One canine tooth on each side.*

IV. Glires. Two fore teeth in each jaw, close together; but remote from the grinders. No canine teeth.

V. Pecora. No fore teeth in the upper jaw; six or eight in the lower jaw very remote from the grinders. Hoofed feet; inguinal teats.

VI. Bel-

* There are exceptions to this order, some of the genera have above six teeth. The Didelphis has 17, the Sorex 19, and the Erinaceous 20.

VI. Bellua. Fore teeth truncated. Hoofed feet.

VII. Cete. Breathing apertures on the head. Pectoral fins. Tail placed horizontally. No claws.

Many objections have been made to this system of classification. It is said to be arbitrary and unnatural. Animals are classed together whose figure and habits are distinctly different. It is therefore alledged that the method is imperfect; and the fact may be admitted without any detraction of its real merits. For although the pride and assumed consequence of man may be offended when he beholds himself ranked with the brute creation, and finds that even the internal structure of such a hideous monster as the bat resembles the real formation of his frame; yet on minute enquiry he will have cause to admire the simplicity and magnitude of that system which shews him his real station, and makes him

him acquainted with the wondrous extent of his own empire. Linnæus has placed man at the head of the Primates, and given him the Grecian dictate, “ Know thyself,” as his motto. By a concise and elegant comment he endeavors to shew, that however near his alliance to the mere animal, yet by the culture of his faculties, it is in his power to prove himself an *intelligent and moral being*.

The nature of our plan will not allow us to enter into a detail of the genera or species; we shall therefore continue our view of the system, by an examination of the orders of the remaining classes.

CLASS II. AVES. BIRDS.

Linnæus has divided these into six orders, the distinction of which are chiefly taken from the beak; but it
has

has been necessary in some genera to take in the tongue, nares, or nostrils, and likewise the feet, and other parts.

I. Accipitres. Rapacious. Birds having the upper mandible of the beak furnished on each side with an angular process.

II. Picæ. Pies. Birds having the beak rather compressed on the sides, and convex on the upper part.

III. Anseres. Web-footed. These have a beak somewhat obtuse, and covered with a thin skin; at the base underneath gibbous, and wide at the end; the *faux*, or edges of the base, denticulated; the feet palmated, or webbed, and formed for swimming.

IV. Grallæ. Waders. These have the beak subcylindrical, and somewhat obtuse; the tongue entire, and fleshy; the thighs naked for some space above the knees.

V. Gal-

V. Gallinæ. Gallinacious. Birds having the upper mandible convex, or arched, and receiving the edges of the lower nostrils, half covered by means of a convex membrane, rather cartilaginous; the rectrices, or tail feathers, more than twelve; the feet cloven, but the toes connected by a membrane as far as the first joint.

VI. Passeres. Passerine. These have a conical acuminate beak; the nostrils ovated, open, and naked.

CLASS III. AMPHIBIA.

All the animals of this class have not the power of living either in air or water; but they have the singular property of suspending the function of respiration, and can perform it in a more arbitrary manner than other animals.

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This

This class is divided into four orders :

I. Reptiles pedati. Reptiles. Amphibious animals, which breathe through the mouth by lungs only; they are furnished with four feet.

II. Serpentes apodes. Serpents. Amphibious animals, breathing through the mouth by means of lungs only. They are destitute of feet, fins, and ears.*

III. Meantes. Gliders. These animals breathe by means of gills and lungs,

* Perhaps this last assertion is not fully proved.—Fishes were formerly supposed to be destitute of the organs of hearing; but several years ago Placentini found some bones in the head of a pike which had the appearance of those organs. Klein improved upon this hint in his History of Fish, &c. Vide Phil. Transf. vol. ix. p. 114. The learned Professor Camper described the organs very fully in the Memoir de Mathem. & Phy. Roy. Acad. Sc. Paris. Since which time Mr. John Hunter and Dr. Monro have demonstrated them in a great variety of species. The probability, therefore, seems to be, that serpents may have the organs of hearing, though hitherto undiscovered.

lungs, and are furnished with arms and claws.

IV. Nantes pinnati. Breathing fishes. These respire arbitrarily by means of gills and lungs. The rays of the fins are cartilaginous.

CLASS IV. PISCES. FISHES.

In the first edition of the *Systema Naturæ*, Linnæus followed the method of his friend Artedi, whose *Ichthyology* was published in 1738, in Holland. This method was established on the structure or situation of the tails in the cetaceous order, and on the difference in the gills, and rays of the fins in the other orders, whether cartilaginous or bony; but (as we have already seen) the cetaceous order is now placed among the *Mammalia*, and the *Nantes Pinnati* referred to the *Amphibia*. In the two last editions our au-

thor forms four orders of the bony fishes, (which respire by means of gills only) and these he has taken from the situation or absence of the *ventral* fins. He compares these to the feet of other animals, and their situation is denoted with reference to the pectoral fins. The orders are,

I. Apodes. Fishes destitute of ventral fins.

II. Jugulares. Those which have the ventral fins placed before the pectoral.

III. Thoracici. Fishes having the ventral fins placed underneath the pectoral fins.

IV. Abdominales. These have the ventral fins placed behind the pectoral, on the abdomen. Some authors, as Artedi and Gronovius have attempted to distinguish the species by the number of the rays in the fins ; but the variation is too great to establish a sufficient character. The specific characters

ters are therefore, at present, taken from a variety of particulars, as the number of rays in the fins, the form of the tail, the cirrhi, or beard at the mouth, the length of the jaw, and the spots and lines on the body, &c.

CLASS V. INSECTA. INSECTS.

A great number of authors appeared before Linnæus on this subject ; but he was confessedly the first who determined the genera of insects, and assigned them their proper characters. He has arranged them under seven orders :

I. Coleoptera. Insects having the wings covered with two crustaceous cases, divided by a longitudinal suture.

II. Hemiptera. Half-winged insects, which have the shells or cases semi-crustaceous, not divided by a straight

straight future, but incumbent on each other in the margin. The beak is curved inwards.

III. Lepidoptera. These have four wings, imbricated, or cloathed with fine scales, or feathers; tongue spiral, and coiled up; body hairy.

IV. Neuroptera. Insects with four naked transparent, or reticulated wings; the tail in most kinds without a sting.

V. Hymenoptera. These have four membranaceous wings, except some few species, which are destitute of wings. The females have the tail armed with a sting.

VI. Diptera. Insects with two wings, having also a balance or club behind each wing.

VII. Aptera. Insects without wings in either sex.

In studying this, as in every other part of Zoology, it is necessary to acquire a certain number of terms, without

without which no real proficiency can be made in the science. The genera of this class are characterized from certain parts of the animals, some of which have technical names, as the antennæ, or feelers; clytra, or outward cases; rostra, or mouth, &c. The head, thorax, tail, and other parts, are likewise occasionally used to assist in forming the character. The species of each of the orders are very numerous.

CLASS VI. VERMES.

We are now arrived at the last class in the System of Nature, which we are to consider as divided by our author into five orders. Linnæus has followed the method of Peyssonel, Jussieu, and others, by introducing the coral and corallines into the animal kingdom, under the names of Lithopyta and Zoo-

Zoophyta. We shall likewise find the study of a very splendid part of Natural History presenting itself to our view, in the examination of the orders of this class. Conchology, or the study of shells, has long attracted the attention of Naturalists; and disputes have arisen respecting the proper method of studying the subject. The shells themselves, as mere coverings, or parts of living animals, cannot certainly demand our primary attention in a system of Zoology. The animals as one whole fall under our consideration, and accordingly Linnæus has made Conchology a branch of Zoology, and not of Mineralogy.

The characters of the orders of this class are very various.

I. Intestina. Animals simple, naked, destitute of limbs.

II. Mollusca. Animals simple, naked, not included in a shell, but furnished with limbs.

III. Te-

III. Testacea. These are generally of the foregoing order, but included in a shell.

This order comprehends the whole tribe of shells, consisting of thirty-six genera, and above eight hundred species, disposed according to a new method. The three first genera are called Multivalves; the next fourteen Bivalves; and the remainder Univalves.

IV. Lithophyta. These animals are composite. They are affixed to, and fabricate a fixed calcareous base, known by the name of coral.

V. Zoophyta. These are likewise called composite animals, and said to resemble a flower, and to spring from a vegetating stem.

Observations are yet wanting to ascertain the two last orders with precision. It is confessedly a matter of the greatest difficulty to draw the line of separation between the three kingdoms. The gradations of organized

N

bodies

bodies are such as obstruct precise definition. Animals may exist whose principle of life resides in a structure of parts resembling the organization of vegetables, as is said to happen in the order Zoophyta; and it is not impossible to conceive that the real living parts of an animal may present themselves to our view in a form resembling that of a vegetable; but it is hardly possible to imagine, nay, it is dissonant to reason, to affirm, that the principle of life can exist in unorganized matter.

The Polype is evidently an animal bearing no resemblance to a plant; and probably future attention and experience to this order may inform us, that all the animals hitherto known under the name of Zoophytes, are properly referable to some other class or order. The whole order consists, according to Linnæus, of fourteen genera, of which nine are fixed, and the rest

rest locomotive; amongst the former are reckoned the Isis, or Red Coral, Sea Fan, Alcyonium, Sponge, Corallines, &c. Among the latter the Polype, Sea Pens, Tænia, Furia, and the Microscopical Animalcula. This view of the genera will be sufficient to shew the great defect of the order itself. For the greater part of the microscopical animalcula, or Animalcules des Infusions, as they are called, have been shewn by the Abbé Spallanzani, and others, to be distinct animals, not always of the class of Vermes. Some, indeed, have a very singular appearance; but I believe none of them are Zoophytes. In the same manner objections may be made to the order of Lithophyta. These animals have been supposed to connect the animal and mineral kingdoms; and it must be confessed, that they appear the last link in the chain of organized matter: but it appears to

me, that Naturalists have taken a superficial view of the matter of fact, and described as Lithophytes, substances which are in reality nothing more than the nests of real animals.

The genera of this order are four: the Tubiporæ, or red tubular coral; Madreporæ, or brain stones; Millepores, and Cellepores. In each of these kinds we observe certain pores or cells, apparently the receptacles or habitations of distinct animals. The assemblage which we view is not therefore to be considered as an animal, but rather as the fabrication of many animals, in the same manner as a shell is the work of a single animal. The coral, in my opinion, properly speaking, is no more a Lithophyte than any of the species in the order Testacea. It must, however, be confessed, that this subject is at present involved in great obscurity.

But

But to return: the generical distinctions of the class of Vermes are taken from a variety of particulars which deserve our attention. In the Intestina the genera are characterized almost solely from the diversity of the body of the animal. In the Mollusca, from the body and feelers, called *Tentacula*, and from other parts.

In the Testacea, the included animal, the general differences among the shells themselves, and principally the *cardo*, or hinge in the bivalves, together with the *aperture* in the univalves, furnish the general character.

In the Lithophyta the inhabitant animal is considered with the form of the coral itself: a proof of Linnæus's opinion of the real nature of these animals. He considers the whole as the fabrications of different animals, and not as one whole animal itself. Have subsequent naturalists entertained the same ideas?

In

In the Zoophyta again the animal and the different forms of its fabrications lay a foundation for the generic notes.

The authors in Zoology are numerous and valuable. Gefner, Aldrovandus, and Johnston, are reckoned amongst the early writers on the Mammalia; and we have already mentioned our own countryman, Mr. Ray, as the predecessor of Linnæus. Many objections (we likewise observed) have been made to the general system of the latter: we shall, therefore, in this place take a view of the authors who have distinguished themselves in the various departments of this combined subject. In 1731, Mr. Klein published his *Quadrup. Dispositio Brevisque Hist. Nat.*—In his first order he has improved upon Ray's method; but in the second, the idea of a natural method seems to have forsaken

forfaken him; as he has combined animals which Nature feems to have referred to diftinct claffes: the camel is placed with the floth, the mole with the bat, and the glutton with apes. In 1756, M. Briffon propofed a method of claffing quadrupeds according to the number or defect of their teeth, beginning with the toothlefs, as the ant-eater, and ending with thofe that have the moft, as the opof-fum.

On the fubject of quadrupeds, we muft not omit to mention the Count de Buffon, whose writings in various branches of Natural Hiftory and Philofophy deferve the attention of the naturalift. It is not, however, with a view to eftablifh the utility of fyftem that we mention this author; he has attempted to reject all fyftem, particularly in the ftudy of quadrupeds, whose numbers are fo few as to give fome countenance to his opinion; but

but although we are unable to subscribe to his sentiments in this, and many other particulars, yet the elegance of his diction, and boldness of his thoughts, give such an air of novelty and genius to his works, as is rarely to be met with in subjects of Natural History, and must always recommend them to the perusal of the curious. His description of animals is generally beautifully just, and truly philosophic. In some instances we have the appearance of prejudice, but it is the prejudice of a philosopher.

Mr. Pennant, the English Linnæus, has given a system of quadrupeds, which is held in high esteem, and by many preferred to that of Linnæus. He follows Ray's method of hoofed or digitated; and, like M. Klein, makes separate genera of the rhinoceros, hippotamus, tapiir, and musk. The apes are placed according to Ray,
and

and followed by the maucaucos. In the arrangement of carnivorous animals he follows Linnæus, omitting the seal, mole, shrew, and hedgehog. The three last are joined to the herbivorous or frugivorous of Mr. Ray. The fourth section of digitated quadrupeds comprehends those which are entirely destitute of cutting teeth, as the sloth and armadillo. The fifth section comprizes those which have no teeth, as the manis and ant-eater. Our author has likewise added the divisions of pinnated and winged quadrupeds. Under the first are comprehended the walrus, seals, and the manati. These, he observes, appear the links between the quadrupeds and cetaceous animals. The bats are the winged quadrupeds, and seem to connect the class of birds.

The class of aves has attracted the attention of many distinguished naturalists. In 1755, Gesner, and 1557,
O Bel-

Bellonius, published upon this subject. Linnæus styles them “ Patres “ Artis.”

In 1599, Aldrovandus, and 1648, Margraave, made additions to the science. In 1676, Mr. Willughby, an Englishman, published his Ornithology; which continues to hold a place in every naturalist's library. He was succeeded by Mr. Ray, in 1713; and in 1726, the study of this class was enriched with tolerable plates by Marsiglius. But these were excelled by Frischius, in 1734. In 1731, Albinus and Catesby employed themselves on this subject. And in 1745, Mr. Edwards published his Ornithology, embellished with very elegant plates. In 1746, Linnæus first gave the outlines of his classification of the aves, in the Fauna Suecica; and in 1758, it was published in the Systema Naturæ. In 1760, appeared the work of M. Brisson, which is held in high esti-

estimation by some of the continental writers. Since which time we have the valuable work of Mr. Pennant, which deservedly makes a part of every English naturalist's library. The Comte de Buffon has also published a splendid Ornithology, but the plates are inferior to those of Edwards.

The authors on the Amphibia are very few: Seba, Catesby, Gronovius, and Garden, comprize the list. The last order of this class has been referred to the Pisces, and treated upon by the writers under that division.

The authors of the fourth class are more numerous than the preceding. The first that we shall mention is Belonius, whose work appeared in 1552. In 1554, Rondeletius and Silvianus both published upon this subject; and in 1558, the indefatigable Gefner was employed in this branch of Natural History. In 1605, Aldrovandus, in

1685, Mr. Willughby, and in 1710, Mr. Ray, made additions to Ichthyology by the publication of their respective observations. In 1760, Seba published his work. He was succeeded by Artedi, the friend of Linnæus, who is universally allowed to have treated the subject in a masterly, scientific manner. He was succeeded by Gronovius, Hasselquist, Catesby, and Garden. To this list we must add M. Broussonet, Professor of Natural History at Montpellier, and honorary member of this Society, who has published one decade of Ichthyologia, in which he has described ten rare and curious fishes, now in the collection of Sir Joseph Banks, Bart. He offers a new method of distinguishing the species according to the proportional length of parts, measuring from certain fixed points, as from the apex of the superior maxilla to the tail fin, ventral fin, dorsal or pectoral fin, &c. This distinction

distinction is founded upon the idea that the increment of all the fixed points in the growing animal is equal, or proportionate.

The authors on insects are very numerous. Linnæus was the first who undertook to determine the genera of insects, and assign them their proper characters. Swammerdam informs us, that no less than four hundred writers preceded him on this subject; and we find, that the study of butterflies was at one time so fashionable, that the Lady Merian actually sailed from Holland to Jamaica in pursuit of this splendid tribe of insects. Most of the authors have invented systems for themselves, and there is now publishing in France a work, entitled, *Papillons de l'Europe*, in which we have some very good plates finely coloured, and a sort of new arrangement. Poda, Sultze, Geoffroy, Scopoli, and Gronovius, are the chief systematic writers.

writers. Sir John Hill divides them into three classes : 1. Apteria, having no wings. 2. Pteraria, including all winged insects. 3. Gymnarthridia, including all insects which have soft and naked bodies, furnished with limbs. Mr. Ray has two principal divisions ; and Dr. Hook has presented us with a Micrography in Folio. Fr. Redi, a physician at Florence, has published several figures, with some new and curious experiments of his own. Malpighi and Bartholine have some fine observations, and we have likewise several interesting experiments on insects in the Philosophical Transactions of London, Paris, and Leipzig. Hoeffnagel, painter to the Emperor Rudolphus, has given plates of above four hundred species. Mr. Albin has likewise given a new history of the English insects, with very beautiful figures. We have also a work on English moths and butterflies,

flies,

flies, by Mr. Wilks, Lond. 1747, 1760. But the *Memoires pour servir à l'Histoire des Insectes*, par M. de Reaumur, à Paris, 1734, 1742, is esteemed the best and most philosophical account of the subject which ever appeared. Bonnet de Geers, Schæffers, Jungius, and Scopoli, with a whole troop of Germans, have been employed as auxiliaries in this pursuit; but to the young student we recommend a little work by Mr. Curtis, as the most useful introduction.

The writers on the class of vermes are only numerous on the order of Testacea. We have no authors of note on the Intestina. On the Mollusca Bohadfschius is the principal; and on the Testacea we find Bonannus in 1684;* and Lister, in 1685, published his

* His work is entitled *Recreatio Mentis & Oculi in Observatione Animalium testacearum* a P. Phil. Bonnano S. J. Rom. 1684.

his *Synopsis Methodica Conchyliorum*,
 Libr. III. Append. 2. Lond.—Ibid.
 1692, Fol.

In 1702, and 1705, Rumphius published on this subject. After whom appeared the following works :

Car. Nic. Langii *Methodus Nova & Facilis Testacea Marina in suas Classes, Genera, & Species distribuendi*.
 Lucern. 1722.

Jac. Theod. Klein *Sciagraphia Tubulorum Marinorum Musei Kleiniani*.
 Ged. 1731—4.

Jan Planci Arminienſis *de Conchis minus Notis Liber*. Venet. 1739. Romæ, 1760—4.

Nic. Gualteri *Index Testarum Conchyliorum Musæi sui*. Flor. 1742, Fol.

L'Histoire Naturelle éclaircie dans une de ses Parties Principales de la Lithologie, & la Conchyliologie, par M***, à Paris, 1742.

The plates of Argenville, which appeared in 1758, with those of Regenfusus,

fusus, executed at the expence of the King of Denmark, are splendid illustrations of Conchology. A copy of the latter is now in the University Library, Cambridge.

Columna, Barrelierus, Plancus, Klein, Ginannus, and Adanson, have likewise written on this subject; but to a beginner Da Costa's Introduction to Conchology is the most useful, and, with Lister and Argenville, will give as much information as most men wish to acquire on this very beautiful and pleasing topic.

On the Lithiophytes we have "Al. Fred. Marfigli Histoire de la Mer, à Amsterdam, 1725, Fol. Observations sur la Formation du Corail, & des autres Productions appellées Plantes Pierreuses, par M. de Reaumur, 1727. And a work by Donatus.

On the Zoophyta we have "Examen de quelques Productions Marines, qui ont été puises au Nombre de
P Plantes,

Plantes, & qui font l'Ouvrage d'une
Sorte d'Insectes de Mer, par M. Bern.
de Jussieu, 1742.

Essays on the Natural History of Po-
lypes, by Henry Baker. Lond. 1743-8.

Memoires pour servir à l'Histoire
d'une Espece de Polypes d'Eau douce,
par M. Trembley. Leyd. 1744.

Lettres d'Eugene à Clarence au Su-
jet des Animaux appellées Polypes. A
Straßb. 1745--8.

Car. Linnæi Diff. Corallia Balthica,
Resp. Henry Foug. Upf. 1745.—
Amæn. Acad. p. 177.

Ejusd. Diff. Tœnia Resp. Godof. Du-
bois. Upf. 1748.---Amæn Acad. p. 53.

Della Storia Naturale Marina dell
Adriatico Saggio del S. D. Vitaliano
Bonati. Venez. 1750.

An Essay towards a Natural History of
the Corallines, by John Ellis. Lond.
1755.

Jobi Basteri Opuscula Subseciva Ob-
servationes Miscellaneas de Animalcu-
lis,

lis, & Plantis Quibusdam Marines Eorumque Ovariis & Seminibus Continentia. Tom. I. L. i. 3. Tom. II. L. i. 3. Haerlem, I. 759. 1765.

Henr. Aug. Wrisberg Observationum de Animalculorum infusoriorum Genesi & indole Saturat. Goetting. 1765.

Lettre de M. Derome de Lisle à M. Bertrand sur les Polypes d'Eau douce, 1766.

Pet. Sim. Pallas Elenchus Zoophytorum. Hag. com. 1768.

Aquatilium & Terrestrium aliquot Animalium Observationes, Fabio Columna Auctore. Rom. 1606.

Ul. Aldrovandi de Animalibus exsanguibus, mollibus, & crustaceis. L. Bonon. 1606, Fol.

Jo. Jonstoni Hist. Naturalis de exsanguibus Aquaticis, Lib. III. Francof. 1650, Fol.

Having gone through the plan proposed, it will be unnecessary for me to detain you any longer ; I shall there-

fore conclude with observing, that in the study of Zoology the subject of Comparative Anatomy deserves particular attention; and as it is intimately connected with general Physiology, it becomes the more immediate object of medical men. The little work of Dr. Monro, as an elementary system, is the best with which I am acquainted. It is, however, to be regretted, that we have no translations of several useful works in the German language. There is one author in particular which I would recommend to the study of those who are able to peruse it: It is the work of Professor J. C. P. Erxleben, published at Gottingen in 1768, and contains the most scientific view of the three kingdoms of Nature with which I am acquainted. It is matter of no small regret to me that I did not meet with it sooner. But I am ready to acknowledge my obligations for the information which I have borrowed

borrowed from it in some parts of this work ; and I am sorry that my ignorance of the German language did not enable me to study some other works, to which I have had access in the library of the learned President of the Royal Society, whose liberality and ardor in the pursuits of science do honor to the nation.

The hints which I have given will, I trust, be sufficient to recommend and facilitate this pleasing science to all ranks of men whom it may concern ; and there are few indeed whom it does not affect. Any farther eulogy or instruction to the young student must appear unnecessary on the present occasion ; I shall therefore conclude with one more physiological plagiarism :

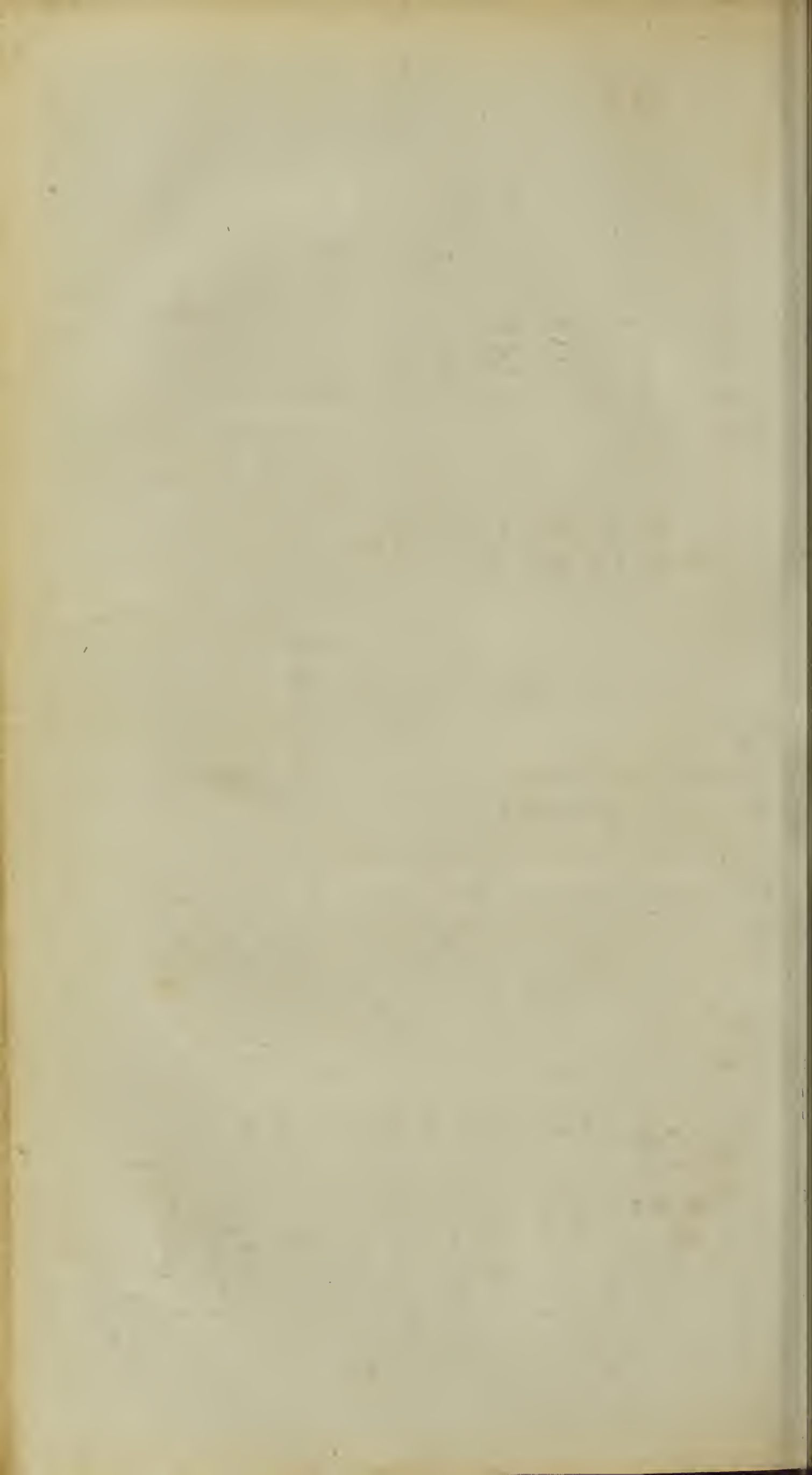
“ Here then we rest : “ The Universal Cause
 Acts to one end, but acts by various laws.”
 In all the madness of superfluous health,
 The trim of pride, the impudence of wealth,

Let

Let this great truth be present night and day,
 But most be present if we preach or pray.
 Look round our world, behold the chain of love
 Combining all below, and all above ;
 See plastic Nature working to this end,
 The single atoms each to other tend,
 Attract, attracted to, the next in place,
 Form'd and impell'd its neighbour to embrace.
 See matter next, with various life endu'd,
 Press to one centre still, the General Good.
 See dying vegetables life sustain ;
 See life dissolving vegetate again.
 All forms that perish other forms supply,
 By turns we catch the vital breath and die :
 Like bubbles on the sea of matter born,
 They rise, they break, and to that sea return.
 Nothing is foreign ; parts relate to whole ;
 One all-extending, all-preserving soul
 Connects each being, greatest with the least ;
 Made beast in aid of man, and man of beast.
 The chain holds on, and where it ends unknown.

POPE'S ESSAY ON MAN, Ep. III. Begin.

F I N I S.



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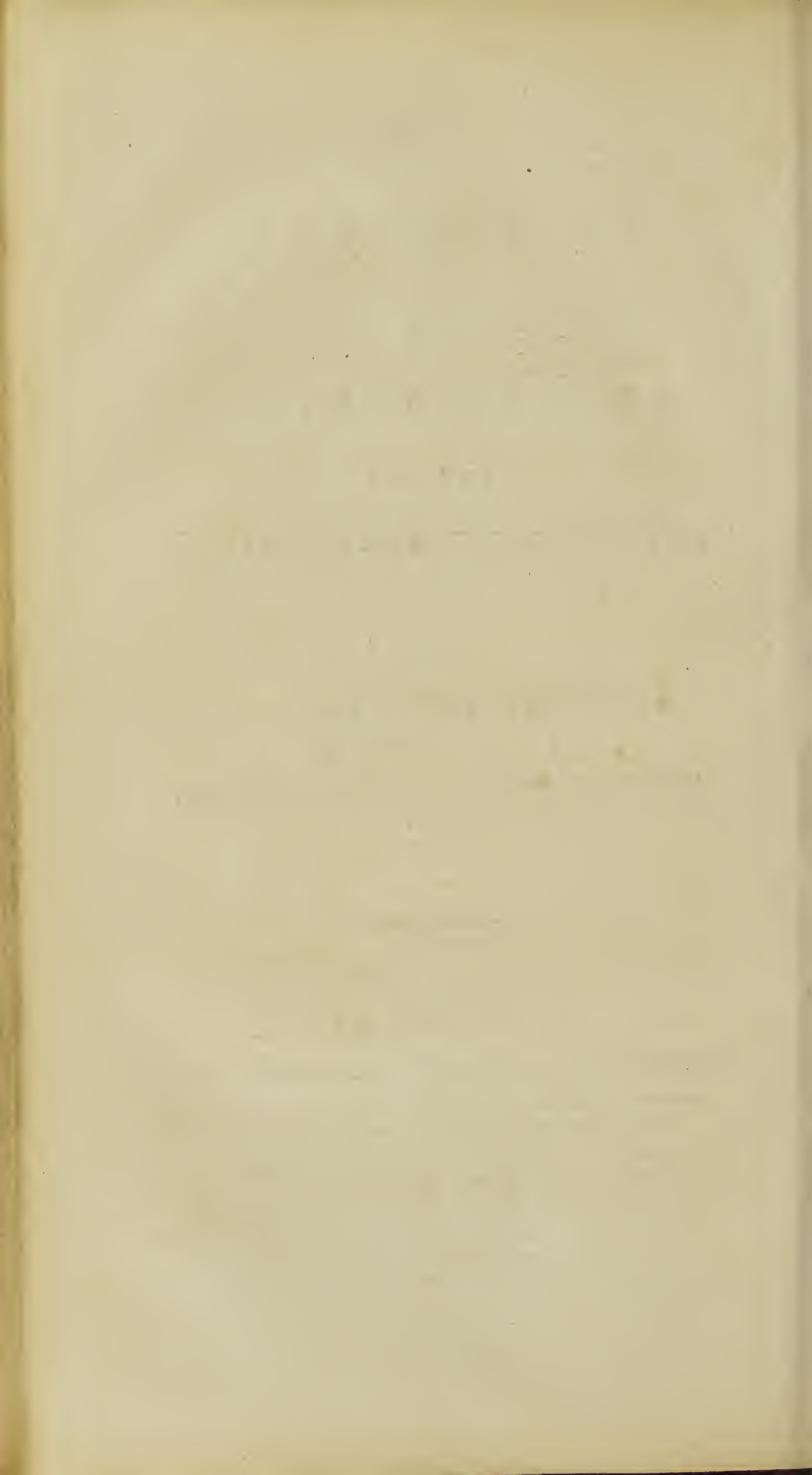
AN
ESSAY
ON
SEA-BATHING,
AND THE
INTERNAL USE OF SEA-WATER.

BY
RICHARD KENTISH, M.D.
F. A. S. EDINBURGH,
MEMBER OF SEVERAL LITERARY SOCIETIES,
&c. &c.

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M.DCC.LXXXVII.



T O

HIS ROYAL HIGHNESS

THE PRINCE OF WALES.

S I R,

THE authors of every age have assumed the privilege of dedication; and I flatter myself, that it will not be deemed presumptuous in me, to take this public method of testifying the dutiful respect which I bear to the illustrious House from which your Royal Highness is descended.—It will be unnecessary for me to stain my page with ex-

A preffions

pressions of servile adulation.—I shall rest contented with expressing my attachment, by a loyal pleasure in beholding the return of that splendid sun which now illuminates the dignity of your Royal Highness; and by assuring you, that I sincerely wish a continuance of that health and happiness which again surround you.

I am, SIR,

with all due respect,

Your Royal Highness's

most obedient, humble servant,

RICHARD KENTISH.

Brighthelmstone,
July 10, 1787.

P R E F A C E.

*I*T is to the Duke of—— that I am indebted for the pleasure which I have had in writing this Essay. His Grace honoured me with early intimation of the resignation which has taken place this season at Brighthelmstone; and I could not hesitate in the adoption of my present plan of becoming an annual candidate for a share of that professional employment which another physician has relinquished. But I must confess that the method which I have pursued is not the most eligible. Instead of studying with particular attention the disorders in which sea-bathing is of service, I ought to have laboured with assiduity at the more important employment of procuring that interest which infuses learning, fame, and riches to its possessors—instead of any attempt to improve my profession, and solve the dark mysteries of medicine, I ought

*to have solicited support from the tutelar deities of Esculapius—from those guardian angels of Hygieia, who tend her temples, and prescribe her rites in the great city of this happy isle—a support which inspires confidence, knowledge, wisdom, and importance, in the minds of those who never saw the face of science, or laboured to pursue her paths.—For, whatever may be the opinion of philosophers, medical biography informs us, that inspiration has not yet ceased—in this learned age we have no need of academical education—no occasion for medical universities—no necessity for the irksome labour and expence of graduation:—any man, nay, any old woman, may chance to have the gift of inspiration, and occupy the art of healing. Physicians acknowledge this gift, and contentedly place themselves upon a level with their inspired brethren—they even affect to revere this supernatural science, and pay it that adoration which its spiritual origin demands. The metropolis and the country alike are blessed
with*

*with these divine productions; and it is matter of no small surprise to men of common sense, to trace the effects of this Promethean fire, which animates the dullest clay, and brings a doctor at once into existence and to fame.—For my own part, I am somewhat sceptical on this subject; and, though my faith has been staggered by what I have heard and seen, yet I have no confidence in the oracular infusions of the age—like the magnetical effluvia of the profound Demainaduc, they may impose upon our senses for a while, but the delusion must vanish. I am ready, however, to acknowledge, with regret, that I am no sceptic to the fate of my profession—I view with infinite compassion its rapid downfall—I see with secret pain the invasion of its privileges; and it requires not the gift of prophecy to foretel, that medicine will speedily sink beneath the attention of a gentleman. No man of liberal education will follow an occupation which presents neither honour, fame, nor emoluments, to his pursuits
—instead*

—instead of a profession, medicine is become a base and iniquitous trade. The persons who are entrusted with the lives of his Majesty's liege subjects throughout Britain—those who conduct the generality of complaints, are collectively, I fear, unacquainted with the general principles which direct successful practice; and such inevitably must be the case, till the legislature takes cognizance of the present crying abuses.—The practitioners in every department of physic ought to undergo a regular series of study, and have their distinct privileges thoroughly ascertained.—Until this is effected, imposition with impunity will shake its lofty head, and laugh at the credulity of those who honour it. But an enquiry into the present state of the practice of physic would lead us to a long detail—I must return from my digression; and inform the reader that the following Observations are written for the instruction of those who use cold-bathing, without any restriction to locality. My reasoning and directions are different from

any that have yet been presented to the public, and I flatter myself that they are worthy an attentive perusal.—More might have been said; and I am not without hopes of being able to make additions at some future opportunity; but a variety of occupations prevent me from enlarging this work at present. I shall therefore submit it, with all its inaccuracies, to the perusal of the candid reader.

Gower-street,
Bedford-square.

A SYNOPSIS, or View of those Diseases in which COLD or SEA BATHING is an approved Remedy.

THE Rickets, and most of the other Complaints
of Children.

Herpetic and Leprous Eruptions.

Elephantiasis.

Convulsions.

St. Vitus's Dance.

Hysterical Complaints.

Menstrual Obstructions.

— — Fluxes.

Female Weaknesses.

Fluor Albus.

Chlorosis.

Giddiness.

Head-ach.

Tooth-ach.

Certain periodical Pains.

— kinds of Inflammation

— — Ulcers.

— — Tumors.

Cholera Morbus, or certain Bilious Complaints.

Jaundice.

Scrophula, or King's Evil.

Incontinence of Urine.

Obstructions of ditto.

Stone and Gravel.

Thirst.

i. Dropsy.

Atrophy.

Consumption.

Scurvy.

Universal Debility without any particular Disease.

Hætic Fever.

Profuse Sweats.

Lethargy.

j. Violent Redness of the Face.

k. — Poisons of various kinds.

l. Hydrophobia.

m. Hæmorrhoids.

A N
E S S A Y
O N
COLD OR SEA BATHING.

THE importance of a subject is often supposed to be connected with its antiquity; and authors are zealous to trace their theme to some distant origin. Medical writers have adhered, with uniform enthusiasm, to this mode of investigation; and the tenor of their attempts has been to convince the reader that they were acquainted with the opinions of others. To make any addition to the common stock of information or attempt any general explanation

B nation

nation of facts, has hitherto been deemed almost unworthy the pen of medical science : the spirit of scientific emulation has departed, and the guide of physic is prompt assertion : contradiction occurs in every page ; and authors, in practice as well as theory, boldly maintain and deny, according to the caprice or interested wish of the moment.

THE subject before us has been wrapped in a cloud of error ; and physicians, by their practice, have declared that they have no settled opinion on the mode of operation, or effects, of Cold-bathing.

SIR JOHN FLOYER, physician at Litchfield, in the year 1702, attempted to call the attention of medical men to this subject ; and so great was the common prejudice at that time, that he was obliged to prove from ecclesiastical history, that cold immersion was used as a ceremony in the
church

church till about the year 1600. “ And
 “ from hence (says he) I shall infer, that if
 “ God and the Church thought that prac-
 “ tice innocent for 1600 years, it must
 “ be accounted an unreasonable nicety, in
 “ this present age, to scruple either im-
 “ mersion or cold-bathing, as dangerous
 “ practices.”

THE arguments of the author succeeded,
 and custom or fashion has reconciled the
 use of cold or sea-bathing in this country.
 But it is matter of no small surprise, that,
 amidst the infinity of publications which
 have appeared, very little or no elucidation
 of this subject has been given since the
 work of Floyer, which, in the opinion of
 its author, was nothing more than a com-
 pilation from the ancients*. Dr. Ruffel,
 in 1753, wrote upon the use of sea-water;
 but his view was to recommend it as an
 internal

* “ Since the methods of cold-bathing (says he)
 “ were well known to the ancient physicians, all I pre-

internal remedy, and he can scarce be said to treat on sea-bathing. Dr. Buchan has given a few erroneous “cautions concerning cold-bathing and drinking the mineral waters;” but his observations are chiefly confined to the latter, and he has given no additions, or explanation of the subject. Some other authors have occasionally delivered their sentiments in a desultory manner; but the work of Floyer, with all its crudities and inaccuracies, is the only express book upon the subject with which I am acquainted: and whoever peruses it, must agree with me, that, exclusive of a few facts, it is little more than the correspondence of a few inebriated physicians of the age, who did not scruple to publish the effusions of their cups, and confess that the imperfections of

“tend to in this essay, is, to recommend what they
 “have done, and to take off any prejudice which the
 “moderns entertain against that practice.”

FLOYER of Cold Baths, L. iv. p. 108.

their

their writing proceeded from intoxication, and the internal use of something stronger than cold water *.——This being the state of enquiry on an obscure part of medical practice, I have presumed to touch upon it, in hopes that my investigations may at least excite the attention of men of science, and my opinion be confirmed, or refuted, to the honour of medicine, and the health of the sick.

THE antiquity of cold-bathing is established beyond controversy. The Egyptians, Jews, Greeks, and Romans, are well known to have used cold immersion, either in their religious ceremonies, or private amusements. The sumptuous baths of the latter are still to be found in this country; and although they had their *thermæ* †, yet the cold-bath was used by them as an article of luxury conducive to health.

* Read Dr Barnard's Letters, and one signed Edward Waldo, p. 269.

† Vide Gibbon's Hist. Rom. vol. iii. chap. 31, p. 214, 4to. edit.

They had their *piscina*, called by the Greeks *πολυμβητρας*, and sometimes *βαπτιστήρια*, which being placed on the north side of their baths, received cold water from some spring; and in these they made it a practice to swim after exercise. Moses in his laws retained the immersion of the patriarchs and Egyptians, and established the custom of washings and purifications. He prescribed it as a remedy in several diseases, as the leprosy, seminal, and menstruous weakness, &c.

PYTHAGORAS taught the Western nations, that purity was to be got by washings and sprinklings; and he was the first who brought the custom of cold immersions, medicinal and sacred, from Egypt into Greece. The most barbarous nations indeed have the custom of bathing, and, in some climates, of immersing their children into cold water, immediately on their birth: and the ancient inhabitants of this country had wells or springs famous for the cures which they produced. The
Gauls

Gauls had their *divona*, or sacred fountains; and it is probable that the Picts, or Britons, who descended from them, had likewise their baths, or occasional custom of washing in the rivers. A people, who in the climate of Britain made use of no other covering than what a little paint rubbed over their bodies afforded, could have no objection to the use of cold-bathing; on the contrary, we can scarce suppose that they could resist the temptation of plunging frequently into cold water. It was the custom of the Saxons to dedicate the wells or springs, famous for cures, to particular saints: thus we have the wells of St. Winifred, St. Mongah, &c. which have long been famous for the cure of rickets, leprosy, and a variety of diseases incident to children and the poor.—Camden informs us, that the leprosy was a very common disease soon after the Norman conquest; and it is conjectured that they cured it by cold-bathing. But it must be confessed, that we derive little in-

struction from the customs of the ancient inhabitants of this island; and it appears that the practice was never used by them, as it was by the other nations of the world in hotter and colder climates. In the days of Hippocrates, cold-bathing was customary in Greece, and he applied it to the purposes of medicine. His observations, it must be confessed, are highly judicious; and it is no small reflection upon the indolence of physicians, that so few additions have been made in the space of above two thousand years. Abstracted from the crudities of theory, his facts deserve attention. —“ If any person in health (says he) cools
 “ himself very much in winter-time, ei-
 “ ther by bathing in cold water, or other-
 “ ways, the more he is cooled (if his body
 “ be not perfectly congealed) the more ve-
 “ hemently he will become hot, when he
 “ puts on his cloaths again, and comes
 “ into a house.” “ Heat (says he) suc-
 “ ceeds the use of cold ;” a fact, to which physicians have not sufficiently attended.

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And he adds, “ If any person heats himself very much, either by a hot-bath, or a great fire, and afterwards continues in the same place, and same habit, as he who was much cooled, he will become more cold, and appear more shivering than the other.” A fact which has likewise been overlooked, till within these very few years, that the subject of heat and cold has attracted the attention of philosophers.

HIPPOCRATES ordered both the cold and hot baths to be used occasionally after eating, as well as fasting : a practice which has not been adopted by his followers ; who, ever anxious to refine upon their master’s facts, have restricted the use of bathing to an empty stomach. — These are the principal observations which the divine old man has left us ; and, few as they may seem, yet, in reality, they are more than physicians have attended to.

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It would be equally tedious and unprofitable to trace the progress of cold-bathing as a medical remedy in the hands of the various writers in physics, who have deluged the world of letters with books which flowed from a poisoned fountain, and with errors in opinion and in practice, that still operate to the discredit of a noble science.

MEDICINE, properly speaking, is a branch of physics; it is founded on philosophy, and, as a part of human knowledge, becomes, in some degree, the object of every scholar. But it has been the attempt of practitioners to make a mystery of their art; and, whenever they are desired to explain the principles on which they proceed, instead of information, the enquirer must be satisfied with hard words, unintelligible jargon, or the more honest confession of downright ignorance.

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THE truth is, that, to this day, there is not extant, in all the volumes of ancient or modern physic, one system, which, as a system, will stand the test of philosophical enquiry. I shall therefore be excused from detailing all the little opinions of great or little writers, and pass over the reasons why one rejected, and another admitted, the utility of cold or sea-bathing. A far more useful, and not less arduous task, will be, to present my reader with a synopsis or general view of all those disorders in which this remedy has been recommended. In doing which, I shall prefer the most common names of the complaints; it being my wish to write intelligibly, and not to puzzle those for whom my enquiry is designed. After giving a view of those diseases, which the writings of others and my own experience inform me are adapted to the proposed remedy, I shall offer some remarks on the diet and regimen to be used by sea-bathers, concluding with

observations and experiments on the *modus operandi* of cold or sea-bathing.—*Brevis esse laboro.*

FROM this enumeration of the diseases in which cold-bathing has been used with success, it is evident, even on the first inspection, that they are all of the same class. They are all diseases of relaxation or extreme weakness. But, obvious as this truth is, it has been overlooked by every writer on the subject; and with wonderful *sang froid* the modern practitioners send their patients to the sea-side, during the hot months, with orders to bleed, purge, and thoroughly evacuate their debilitated constitutions, before they use a remedy, whose effect is to restore the strength, which disease and physic had conspired to impair. Floyer, Ruffel, Buchan, all recommend this plan; and nothing but the happy reluctance of the sick to submit to their opinion, and adhere to the noxious rules which they laid down, could possibly have maintained that share of reputation to sea-bathing, which
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it now possesses. Nature and common sense alike repudiate such false practice; and, instead of evacuation, it is plain that the most tonic remedies ought to be used, in the whole catalogue of diseases which we have enumerated. Can it be supposed that a sick, weakly, ricketty infant, requires purging and bloodletting?—Can it be imagined that slender, delicate females, whose nervous frames are susceptible of the slightest changes, and whose habits of life subject them to great relaxation and enervation—Can it be for a moment maintained, by any person of plain understanding, that these patients, with a whole list of others labouring under loss of appetite, loss of strength, and various diseases known by the names of hysterics, St. Vitus's dance, convulsions, epilepsy, &c. —Can it be maintained that these complaints are adapted to the sanguinary rules recommended by physicians? To the sanction of reason I can add experience, and from my own practice, and the testimony of two or three very judicious practitioners,

titioners, I can affirm that they are not.—
 A very contrary treatment must be insisted
 upon; and, happily for mankind, the reme-
 dies are not of an unpleasant sort, or, in
 general, difficult to be attained. Good
 nourishing diet, and moderate exercise, are
 within the reach of most invalids, and
 they are the remedies to which our atten-
 tion ought to be primarily directed.—Me-
 dicine is but a secondary aid—a substitute
 for the natural powers of food, of diet,
 and of regimen;—unhappily, however,
 physicians have reversed the view, and,
 instead of considering, that the existence
 of the body in disease, as well as in health,
 is supported by the same agents, they have
 sought for the cure of disease on different
 principles—they have ransacked the three
 kingdoms of nature, and laboured in the
 very elements for their imaginary powers
 of physic — with what success, the pre-
 sent state of practice, and uncertainty of
 cure, can tell.—I mean not, by these ob-
 servations, to debase my profession—on the
 contrary, I mean to insist upon an impor-
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tant truth, and wish to turn the attention of patients and physicians to their proper object—If both do not alike attend to the habits of life, neither can be benefited. The patient cannot derive relief, nor the physician credit.—When we act in concert with nature, we have much in our power—when we counteract her indications, all is mischief.

IF I am right in my assertion, that all the diseases in which sea-bathing is of service, according to the present accustomed mode of using it, are diseases of relaxed and weakened constitutions, it must follow, that the same general rules, with a few exceptions in particular cases, are adapted to all patients to whom the remedy is properly recommended.

IT is unnecessary to go through a minute examination of the symptoms which characterize the various diseases in the synopsis—they are sufficiently well known to medical men, and would afford neither
instruction,

instruction nor amusement to patients; I shall therefore content myself with a few general observations, which may have their use to sea-bathers themselves, as well as those who are entrusted with the care of their complaints.

AND, in the first place, let it be observed that evacuation does not necessarily precede the use of cold-bathing, either in the sea, or any other bath. In some cases it may be admitted, but in ninety-nine out of a hundred it will do great harm, and the injury thus induced cannot easily be removed. The body, in disease, as in health, ought to be kept open; and those complaints which are accompanied with bilious foulness of the stomach particularly require this caution; but purging and costiveness are equally injurious.

THE diet calculated for sea-bathers is of the most nourishing kind; and, as it is

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a medical fact (though but lately allowed) that animal food contains more real nourishment, and conduces more to give strength, than vegetables, such food ought to be used ; and it may be esteemed a good omen when such diet is preferred by the sick. The common viands, of beef, mutton, lamb, veal, pork, or poultry, according to the palate of the patient, are suitable, and require very little culinary art, to convert them into excellent articles of the *Materia Medica*. Roasted meat is commonly better adapted to weak stomachs than boiled ; but either may be allowed. Vegetables of every kind should be used sparingly. Small quantities of fruit have sometimes a good effect as laxatives ; but I once had a patient at the sea-side, who was thrown into the most violent pain, and spasmodic convulsions of the stomach, whenever she indulged in the use of vegetables, even in the smallest quantity. In general, therefore, they ought to be entirely rejected, or sparingly

sparingly used, wherever the stomach is debilitated.

FISH, plainly dressed, makes a most excellent diet for many invalids; and shell-fish is particularly recommended in disorders of the *primæ viæ*. I have known it of great service to children, and bilious persons.

THE common drink of the sick should be attended to with great exactness. In many cases malt-liquor has a bad effect, but in others, I have seen it of service; and where it does not evidently disagree, it may be used with advantage. Spirits and water may sometimes be substituted as a beverage; and we may venture to lay it down as a rule, without exception, that whenever sea-bathing is useful, according to the mode of which I am now speaking, the moderate use of strong liquors, as beer, spirits diluted with water, or wine,

cannot do harm, but, on the contrary, necessarily make a part of the regimen to be observed throughout the cure. Good Port, or Sherry, generally agrees with the stomach, and acts as a powerful tonic.

EXERCISE, and sea-air, are the great auxiliaries of sea-bathing, and very frequently prove beneficial to those invalids who cannot, or ought not to enter the bath. The purity of atmospheric air depends upon a variety of local circumstances; and, as it is a fact beyond dispute, that the purer the air, the fitter it is for the purposes of life, so there can be no doubt that the healthiness of a place is intimately connected with the purity of its atmosphere. And as the vicinity of the sea, or large tracts of pure water, is found to produce a chemical change on the state of the surrounding air, by the absorption of those impurities with which it is phlogisticated, such situations are justly supposed to have
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an atmosphere better adapted to the purposes of respiration, than those which do not enjoy this advantage. But the salubrity of sea-air seems to depend on other properties besides its chemical qualities. Its temperature produces a considerable effect. Air which passes over a large tract of water is cooled, as well as purified; hence, at the sea-side, we feel none of those bad effects, which arise from the sultry heats of summer in inland places. A constant cooling breeze moderates the excess of heat, and, by preventing the pernicious operation of such excessive stimulus, produces the most salutary effects. I have generally observed that weakly persons, in almost every complaint, suffer more from excess of heat than cold. To thin, consumptive habits, and particularly those affected with cough, and profuse sweatings, hot air is prejudicial;—a very exact medium is required to constitute health. Some physicians have lately asserted, that they never observed sea-air of service in

pulmonary complaints; but the conclusion they infer would be rash; and it can be proved from medical writers, and undoubted testimony, that many, very many patients have experienced its salutary effects in this disorder; and I am thoroughly convinced, from my own experience, that the only reason why we do not oftener perceive such happy consequences, arises from the baneful practice which has been insisted upon in these diseases. Mistakes in medicine always entail mischief. The danger of bad treatment never appeared more fully than in that dreadful endemic disease of this island, the pulmonary consumption. Thousands have been literally sent to the grave by the lancet and low diet. And, innocent as milk may be, it has, in the hands of medical men, been converted into a most destructive poison. False notions of nourishment have given rise to false medical practice; and practitioners have imagined that they were supporting their patient, whilst they were

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feeding

feeding his complaints. But it is foreign to our enquiry to pursue this observation farther. I have argued upon it at some length, in another work, which I mean to enlarge and send into the world at some future opportunity *. In this place it is sufficient to observe, that if proper diet, regimen, and medicines, be conjoined with sea-air, in pulmonary complaints, during the heat of summer, we shall often perceive its very salutary effects.

THE exercise of sea-bathers ought to be moderate, and constant. Riding, either on horseback or in a carriage, is often preferable to walking; but the latter should occasionally alternate, and in some cases be preferred. Sailing is likewise particularly adapted to some complaints. And I am of opinion that dancing, fencing, jumping, swinging, swimming, and a variety of the gymnasia, are worthy the attention of physicians, and ought to be introduced

* Dissert. Inaug. de phthisi pulmonali idiopathica.

into the *Materia Medica*, with some other pleasant remedies, under the title of *Jucunda*.

HAVING premised thus much on the regimen of the sick, it remains that I speak of the time and method of using the cold-bath. Under the advantages of a proper contrivance, cold or sea bathing may be used at any season of the year; but the time best adapted for this remedy is the heat of summer, when it presents itself as the immediate cure of many disorders, arising from the relaxation then produced. The common practice is to advise the patient to go in fasting, and, plunging the whole body and head once under water, to come out again, and dress with expedition. Such a method will agree with many; but I have met with persons who could not bear to enter the bath fasting; and I have observed bathing to disagree from this circumstance only; as it proved highly beneficial to the same persons, who used it soon after moderate eating,

eating. On this account I think myself at liberty to dissent from the common opinion, and recommend to very debilitated persons a small quantity of food previous to their entering the bath. In doing this I only revive a practice as old as Hippocrates; but it is necessary to observe, that to persons in health, and those not much weakened by disease, the common method of using the bath fasting is to be preferred.

A GREAT deal of attention is often required to make bathing agree with weakly persons; many of whom are chilled, and rendered worse, by its indiscriminate use. In some cases I have known a glass of warm wine, or stomachic medicine, of great service immediately on coming out of the water. For it must be remarked, that cold-bathing never produces any good effect, unless it is succeeded by a pleasant sensation of glowing warmth; and nothing more effectually produces this, than a grateful

grateful stimulus taken into the stomach immediately after its use. Such I have found the following :

R Conf. cardiac. ʒij.

Aq. cinnam. ten. ʒvi.

————— fort. ʒi M. sumat cochlij.

Amp. pro re nata.

Two large spoonfuls of this mixture will be found of great service, in weakly habits, especially after the first or second time of bathing; and in those cases where the bark is necessary, a decoction of it, with some of the spirituous tincture, may be substituted. A particular attention to the heat of the body is likewise requisite. If a person enters the bath when he is very cold, the debilitating effects will prevail, and many bad consequences ensue;—on the contrary, if he be too much heated, there is great danger. Caution is therefore required on the part of the sick. The morning is undoubtedly best adapted to the use of the cold-bath,

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as we thereby derive its benefits during the heat of the day ; but I have known several sickly persons made worse by being obliged to conform to the practice of bathing early in the morning. *Diluculo surgere saluberrimum est*, is an excellent motto for the generality of invalids, as well as persons in health ; but a temporary debilitating power, with a view to produce a strengthening effect, ought not to be used when the body is in too weakened a state, lest the strength of the system should be insufficient to combat the remedy. In cases of great weakness, therefore, I would advise sea-bathing at noon ; and in general the best method is to plunge once over-head, and return into the machine immediately. Rubbing the body with dry coarse cloths, has very often the good effect of quickening the returning circulation on the surface, and wiping off a quantity of foul matter which will collect on the skin of the most cleanly person who does not use the bath. From
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a very false theory, some persons have recommended sea-bathers to plunge head-foremost into the water *, so that the head may be the first part which touches the water ; and I once knew a very courageous young lady, who, being informed of this method, had the resolution to try it, and literally caused her head not only to be the first part which touched the surface, but likewise the very bottom of the water—a practice which no person in his senses, and much less a physiologist, could possibly recommend. The fact is, that so far from the blood being driven to the head by the application of cold water to the extremities, the impetus of it in that organ is considerably diminished, and the heart, lungs, and internal viscera only receive an accumulation of that fluid. But when the head is downmost, either in or out of water, there can be no doubt but it must give rise to the greatest possible afflux of blood, and which we find

* Vid. Buchan's Domest. Med.

may be done without injury to persons in health.

IN giving directions to sea-bathers, it is necessary to remark on the subject of covering. It is customary for many persons to use an oil-skin cap, which prevents the access of water to the head, and keeps the hair dry. This practice deserves the attention of medical men, and may be regulated to the benefit of the sick. In the generality of cases, I am persuaded that it is salutary to wash the head with the rest of the body ; but where the hair is worn very long, and the person labours under great weakness, it would be attended with some degree of danger to suffer such a continued application of partial cold, as the wet hair must occasion. For we are to recollect, that the very act of its drying is a debilitating process, evaporation being well known to produce a great degree of cold. On this account, the practice of covering the head ought to be recommended in many instances ; whilst
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the more healthy bathers will feel the good effects of keeping the head cool, and washing off that fordes, which nothing but fashion could induce a cleanly person to put into his hair. It may, indeed, be for the advantage of all sick persons to get rid of this unnecessary load during the heat of summer, and, by wearing the hair thin, or short, allow of the application of cold water to the head, which has always been deemed a salutary practice, and will be found beneficial wherever it can be properly applied.—The custom of using flannel dresses appears to be necessary from decency alone. But the machines ought to be so contrived as to render them unnecessary ; and wherever that is the case, it will be found better to apply the watery element to the surface of the body alone, than through the medium of wet flannel. It is, probably, from inattention to this circumstance that cold-bathing disagrees so often with the ladies, whilst gentlemen, unaccustomed to this kind of apparel, feel
more

more constantly its good effects.—These observations apply to the common mode of using cold or sea-bathing. There is, however, another method, which deserves notice. By a contrivance called the shower-bath, the application of cold may be rendered extremely useful. This mode of bathing is found particularly serviceable in cutaneous eruptions; and probably the impulse of falling water, is a stimulus well adapted to excite the action of the vessels on the surface of the body. The pumping of cold water on paralytic limbs is an ancient practice, and I have in some instances seen more good effects from it than frictions, or the hot-bath. The only difference betwixt sea and fresh water, applied externally, appears to arise from the specific gravity of the former. Some effects indeed may arise from the saline particles which are left in a state of chrySTALLIZATION upon the surface of the skin; but from the custom of rubbing the body with dry cloths, we may perhaps overlook this action, except in certain morbid

morbid affections of the skin, where it might be adviseable to let the body dry without wiping. As I have no experience on this subject, I only throw out the suggestion as a hint to others.

THESE are the principal observations necessary for sea-bathers. The subject would admit of much enlargement, but it has been my wish to abridge every part of this view, and to present the reader with a concise opinion, which in many respects will be found to militate against the routine of common practice. If I am right, other authors and practitioners have erred; but if I am in error, their judgment will prevail; and I wish to appeal only to the decision of truth. My sentiments cannot fail of exciting the attention of my profession, and such invalids as are able to judge of the rationale in argument. In this instance I am willing to be tried by the success of the event, and have no hesitation in submitting to the conclusion
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of those who candidly enquire. From what has been said it must appear by no means matter of indifference to the sick, which plan they pursue. If one set of physicians recommend bleeding, purging, and starvation, whilst others insist on good-living, wine, animal food, diluted spirits, and agreeable exercise, as the auxiliaries of sea-bathing; it may be inferred that there must be a great difference in the result of their practice as well as theory.

I HAVE scarce touched upon the administration of medicine in this discourse, as few patients will be found sceptical enough to labour under the afflictions of those dreadful diseases which are enumerated in the synopsis, without having the advice of some medical practitioner, and in the character they prefer it is their business to confide

ON THE INTERNAL USE OF
S E A - W A T E R.

IT has been the fate of phyfic to have remedies which at one period have rifen to high eftimation, and at another, have been unnoticed; and fuch has been the fluctuation of opinion, that the medicines of a former age, after a lapfe of years, have been again revived, and by the aid of fupposed novelty, or even the recommendations of antiquity, they have twice fupported, and as often loft the occupan-
cy of a favoured reputation. Sea-water is of this number. The ancients were well acquainted with its ufe. Hippocrates prefcribed it, and Afclepiades, Themifon, Celfus, and others, looked upon fea-falt as an active remedy. In the Ifle of Cos, and fome other of the Grecian ftates, they mixed it with their wine; and Cel-
fus,

fus, treating of the scrophula, or regius morbus as he calls it, recommends, “vinum bibere falsum græcum, ut solutio ventris remaneat.” Pliny has given us great information on this point; and we learn that the remedy was very universal in Greece, and among the more early Roman physicians; but we do not find that it was ever adopted by the systematic writers of any note since the time of Celsus.

IN the year 1753, the attention of medical men was directed to this subject by the work of Dr. Richard Russell, physician at Lewes, who is justly venerated as the cause of that celebrity which Brighthelmstone has since acquired. The contents of this volume do credit to the author; but the service which it rendered medicine may admit of doubt. Besides an erroneous account of the chemical contents of sea-water, we have a mode of practice recommended which is confessedly

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fessedly improper. In those dangerous diseases where sea-water is recommended instead of bleeding, purging, and low diet, a contrary system is now pursued with great advantage. And it is, probably, from this unhappy junction of opposite remedies in Dr. Russell's Tract, that the practitioners of modern times seem inclined to reject the internal use of sea-water. But the mode of reasoning from general principles, requires great circumspection, and a much greater attention to minute circumstances than is commonly given. Although we admit all the facts which are adduced in favour of sea-water when conjoined with evacuation, yet we must attend to the experience of the times, and beware lest, in the examination of an effect, we overlook the cause—a knowledge of which is the object of every rational practitioner. Diseases and obstructions of the glands are common to persons of the most weakly, delicate habits, and such complaints frequently accompany the idiopathic consumption of this country.

country. These constitutions, it is true, are not fitted for evacuation ; and this disease is found to be aggravated by low diet ; but when such morbid affections of the glands become universal, although they are but secondary causes of the general complaints, yet they necessarily deserve our attention, and sometimes, perhaps, ought to make the primary object of our consideration. Their removal will give strength to the system ; and we shall find that it can be done without evacuation. In our enquiry after causes, we are to view effects as causes of other effects ; and in all organized bodies we have great reason to attend to this remark, for every secondary cause is capable of producing powerful changes in the phenomena of life, health, and disease. The enlargement of glands may depend upon the laxity of the part, or the weakness of the whole frame ; but when such an enlargement has taken place, the reduction is seldom to be effected by the common tonics alone. A

particular stimulus to the part affected is necessary, and such sea-water has been found to be. When taken internally for a considerable length of time, it has been found to remove the most dangerous glandular obstructions. If we attend to its operation, we shall see the greatest inducement for its exhibition from theory, as well as experienced facts; and we shall likewise see, that evacuation must necessarily impede, instead of promoting its action, as is the case with mercury, and other stimulant deobstruents taken into the system. When sea-water is taken into the stomach, and not hurried through the *primæ viæ*, it will be absorbed by the lacteals, and thence carried into the mass of circulating fluids, where its chemical contents will operate on the coats and contents of the vessels through which it passes. Marine salt, Glauber's salt, and Epsom salt, which are the principal active parts dissolved in the water of the sea, when taken into the mass of circulating fluids, must necessarily produce

duce a powerful stimulant effect, particularly on the excretory organs through which they pass. Accordingly we find, that the kidneys are stimulated to an increased secretion of urine, by these saline substances, which seldom fail of acting, in some degree, as diuretics; and it is a fact well known to graziers, that common salt is a sovereign remedy in that dreadful plague, the rot of sheep; which I have had an opportunity of knowing, from dissection, is commonly attended with a disease of the liver in these animals. In that complaint, this organ is commonly found to be enlarged, and of a putrid appearance, having the gall-ducts filled with animalculæ. I know a gentleman, who, upon the certainty of the experiment, bought a great number of rotten sheep at a low price, and, by giving them daily a quantity of common salt sprinkled upon their hay, they gradually recovered, and were again sold at a high price. My friend was first induced to place confidence

in this remedy, by observing that a sheep of his, when very ill, from the rot, or some similar complaint, used daily to lick one part of the wall in the yard where it was confined, and which part he found to abound with a saline efflorescence, very common on damp walls. As the animal, by this instinctive knowledge, derived benefit from salt, he had no doubt of the event of the experiment which we have described.

I SHALL conclude my observations on the utility of marine salt, with the opinion of a great man. Dr. Black, in his Lectures, remarks, that “ this salt is very antiseptic, and assists or promotes digestion; and is known to be a necessary of life to man: but,” says he, “ on a transient view, it does not appear to be so to other animals; yet I think it really is: for this salt is certainly found in the purest and freshest water. In Germany and Asia it is given to cattle. In

“ In America the wild animals are well
 “ known to flock in amazing herds, mak-
 “ ing passages through the thickest woods
 “ down to the sea-side, or salt-springs,
 “ to taste the salt. It is there used as a
 “ bait for deer; and an offer of salt is
 “ more tempting there, than an offer of
 “ corn.”

“ SIR JOHN PRINGLE’S discoveries
 “ have been thought to account for this
 “ utility of salt. He found large quan-
 “ tities to prevent, and small ones to
 “ promote putrefaction : — hence some
 “ have thought, that it promotes the ne-
 “ cessary degree of putrefaction in our
 “ alimentary canal. A small quantity is
 “ found to kill some of the carnivorous
 “ animals, as the hog; — therefore it
 “ would seem to be the best corrector of
 “ vegetable and acescent food. As it is
 “ the most useful, so it is the most plen-
 “ tiful, of all the salts*.”

* Extracted from my MS. notes, taken at Dr.
 Black’s Lectures.

FROM

FROM all these arguments we conclude, that sea-water, as a solution of common and other salts, may become a very powerful remedy, in the hands of a judicious physician. I shall here subjoin a table of those diseases, in which it has been successfully used.

A SYNOPSIS of those DISEASES,
in which the INTERNAL USE of SEA-
WATER is an approved Remedy.

Scrophulous Swellings and Sores.

————— of the Neck.

————— Eyes, &c. &c.

Strumous Swellings.

Humid and dry or scurfy Leprosy.

American Scrophula.

Swelled Legs, and enlarged stiff Joints, from the Gout
or Rheumatism.

Diseased Glands of the Uterus.

Jaundice.

Colic.

Dropfy.

Consumption.

Scrophulous Ozæna, or Complaint in the Nose, with
Swellings of the upper Lip.

Ulcer of the Tibia with Caries.

Tenesmus, with Ouzings of bloody Ichor.

Itching and Tubercles of the Pudenda.

Cough, with glandular Swellings in the Neck, and
bilious Vomitings, with profuse Spittings.

*. Dr. Russell has mentioned a case or two of Chorea Sancti Viti,
Gonorrhœa, and Hernia Humoralis, in which this remedy was tried,
conjoined with others; but no inference can be drawn of its utility; and
I should think it unlikely to do service in those case

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IT only remains, that we add something on the mode of using sea-water internally. It is customary to join other remedies with it; and there are cases, in which this junction is necessary.—Mercurials, in small doses, are often serviceable, but they require caution. *Æthiops*, antimony, cinnabar, and the calcined ashes of submarine plants, with burnt sponge, corallines, millepedes, and a variety of other articles, are recommended; but I never observed any powerful effect in them, although I have frequently known them continued for a length of time. The *Æthiops vegetabilis*, which is the calcined ashes of a species of *fucus*, or sea-weed, was first introduced into the shops by Dr. Russell, but it has never obtained great credit. The fossil alkali and some of the neutral salts might, probably, assist sea-water; but if we can persuade patients to take a sufficient quantity of this remedy, they will seldom be necessary; a strict attention

tention to proper diet and regimen being enjoined. I must confess myself an advocate for the ancient practice of medicating wines with salt; and I am of opinion that these two remedies mutually assist each other. I have now a patient who has received great benefit from so small a quantity as a single wine-glass of sea-water drank every evening. The lady was afflicted with troublesome cough, attended with a great deal of phlegm, and bilious vomitings in a morning. She had large glandular swellings under the chin, and in the neck, which, upon the use of this small quantity of sea-water, conjoined with animal food and wine, have gradually lessened; and the cough, with sickness and vomitings, nearly left her, before she continued the remedies a week.—But, notwithstanding the happy success in this case, I am persuaded that a much larger quantity ought to be taken, and continued for a great length of time, in most cases. If the remedy does not purge, too much can scarcely be taken.

And

And happy indeed is it for mankind, that they are possessed of any remedy (however nauseous) which can effect a cure upon complaints, so far beyond the reach of immediate operation, as glandular diseases.

ON THE OPERATION OF
COLD OR SEA BATHING.

IN reasoning upon this subject, we must attend equally to the facts of chymistry and physiology.—By the former we learn, that cold is only the negation of heat. By the latter we know, that the living body cannot exist without a certain proportion of this universal principle, which pervades all nature, and is the efficient cause of animation, vigor, and all the phenomena of life. The organized and unorganized parts of matter alike acknowledge the universality of heat: by its operation, order and uniformity in appearance is maintained: by its excess or defect the mode of existence is altered, and annihilation frequently ensues the slightest deviation in degree: solids become fluids or *vice versa*: vegetables and animals cease to live in extremes of this grand agent of nature; but they have the singular property of retaining their natural temperature in

very great excesses of heat or cold. The temperature of the human body is asserted to be 97° of *Fahrenheit, and the degree of external heat fixed upon by philosophers, as the standard of health, is 64° of Fahrenheit. Every continued deviation from this standard is supposed to produce a morbid change on the human body. An excess has been said to act as stimulant and a defect as sedative. But great confusion has entered the arguments of physicians on this subject. Some have maintained, that heat being positive, and cold negative, the former must have one uniform action, in opposition to the latter; and as heat, in one instance, is a positive stimulus, so in every instance, whether above or below the standard, it is still a stimulus, and must produce, though in a lesser degree, the same stimulant effects;—others affirm, that heat below 64 or 60° of Fahrenheit is always a sedative to the action of the living powers. But the dispute is of words, and the conclusion is the same in both cases. By a lesser stimulus, the

* Vid. Gov. Ellis's Paper, Phil. Transf. vol. iv. p. 755. et Mem. de l'Acad. année 1764.

former mean what the latter intend by the word sedative. Hence we find, that it is universally agreed among physicians, as well as philosophers, that the properties of heat are stimulant. Dr. Cullen was the first who ventured to affirm, that cold, or the negation of this powerful stimulant, may itself, in certain circumstances, become a stimulant. His arguments, or rather his facts, demand attention. “Considering,” says he, “how much the vital principle of animals depends upon heat, it cannot be doubted, that the power of cold is always, more or less, directly sedative. But it is equally manifest, that, *in certain circumstances*, cold proves a stimulus to the living body, and particularly to the sanguiferous system.” Great objections have been made to this opinion, and it has been said, by those who pretend to argue on philosophical principles, that such effects cannot be; two opposite effects can never arise from the same cause! the

same power can never be at the same time stimulant and sedative!—Granted.—But what follows? The same power cannot produce precisely the same effects, unless it be in precisely the same circumstances. If, therefore, the circumstances vary, the cause varies, and the effects must vary likewise. This is the consequence of the true mode of philosophizing, but it is a result which has been strangely overlooked by the most ingenious of medical reasoners. The followers of Dr. Brown, whose chief aim has too often been merely to contradict the professor we have mentioned, have fallen into this practical error; for I maintain, that errors in theory are the foundation of errors in practice, and these systematists, captivated by the speciousness of a system which professed to have its basis in the true philosophy, and which affects to quote Newton and Bacon as its example in argument, have strangely forsaken their own principles: they have even ventured

tured to deny the efficacy of cold-bathing, and, because it appeared to militate against their doctrine, they hold it hurtful in those diseases where experience shews its efficacy, and rashly denounce an anathema on one of the most powerful remedies in physic. But the doctrine of stimulants has laid the foundation of errors, hypothetical and practical.—Circumstances and minute contingencies have not been sufficiently attended to.—The same power which operates as a stimulant on the living system in one circumstance, may in different circumstances, nay, must produce, in some degree, different effects.

If this be granted me, and I know no sophistry by which it can be denied, I shall think myself justifiable in maintaining, that Dr. Cullen's argument is valid; and, although I am by no means the advocate of his doctrines, in general, yet, as the searcher after truth, I will accord to his reasoning on the operation of cold,

and assert, that it is, as an abstraction of heat, a sedative; but that, in effect, the circumstances being varied, it may prove a stimulus to the living body; and it appears, that this operation is not limited to the human species, but follows as a natural consequence of the property of universal diffusibility which heat possesses. According to this property, bodies become heated in proportion to their capacities for receiving heat, and the greatest capacity for sensible heat is cold. It therefore follows, that whenever a body happens to be colder than the circumjacent bodies, the nature of sensible heat, chemically ascertained, is such, that a portion of it must leave the substance which it formerly occupied, and enter the matter thus capacitated to receive it. When the human body, by the external application of cold, is partially deprived of its heat, its capacity for heat being increased, it must follow, that whenever the same body, thus capacitated, comes
within

within the operation of heat, an accumulation of that property, whatever it may be, must necessarily take place. And, the effect of heat being acknowledged to be a stimulus to the living system, it must follow, that an increased capacity, with an increased accumulation, must produce stimulant effects.—Accordingly we find, that the consequence of a preternatural deprivation of heat, to a certain degree, is an increased capacity for heat; and the consequent accumulation of this matter, or property, on the return of the body to the situation whence it can be acquired, is a stimulant operation. This follows our mode of reasoning, and we shall find the opinion established by experiment.

HENCE, whenever the body is deprived of its proportional degree of heat (within certain limits) the effect of that deprivation is an increased capacity, and the operation of that increased capacity a stimulus to the system.—Thus a person sud-

denly deprived of a portion of the heat of his system, whether it existed in a sensible or latent state, on his return to those circumstances where the heat can be recovered, will feel, in a very sensible degree, the return of this stimulus. A view of what actually happens in the cold-bath will confirm this reasoning. The body, on its immersion in the cold water, suddenly loses a portion of heat, particularly of the heat of the surface; and, as long as the parts continue exposed to this degree of cold, a continued abstraction of heat is the consequence: but the instant that the body is out of the water, or in such circumstances as to receive heat from an ambient atmosphere, that instant will its return be perceptible, and the effect of such return will be stimulant.

HENCE, after bathing, we feel a glowing warmth, a recovery of sensible heat on the surface of the whole frame, which, exciting the action of the vessels, proves a
 tonic

tonic or stimulus to the whole system; and, in a medical view, we must expect the most powerful effects from such a universal stimulus. In all diseases of general weakness, the circulation on the surface and extremities is very languid—the vessels and muscular fibres become inert, lose their tone and action, and are incapacitated for the functions of health; but by the application of an universal stimulus to the surface, the living principle is excited, and the action of every part is made whole. Thus much we learn from the chemical nature of heat; whilst a farther attention to physiology gives an additional explanation of what happens in cold-bathing.—The blood, being suddenly driven from the surface to the heart, and internal vessels, proves a powerful stimulus, and excites their action in an unusual manner. Hence, on the removal of cold, the blood is quickly propelled to the smaller vessels, which, conjoined with the accumulation of heat from the at-

mosphere, is the cause of the glow and other stimulant effects which succeed the cold-bath.—From this view of the operation of cold it must appear, that the cold or sea bath is calculated for diseases of weak habits; and accordingly we find the complaints enumerated in the synopsis, all of this kind.—But it must be observed, that we are here treating of the sudden application of cold, and the consequent sudden application of heat; for if this remedy be gradually applied, and long continued, the living system will be so much weakened, that the return of heat to the surface will be insufficient to excite the action of the vessels in such a manner as to give strength, and the action of the larger vessels being impaired, they will be unable to propel the blood into the smaller;—hence the paleness and cold which succeed too long a continuance in the water. For we are not to admit the full force of Hippocrates's remark, that “the more the body is cooled (if it is
“ not

“ not perfectly congealed) the more it
 “ will afterwards become hot.” A continued application of cold, below 60° , proves debilitating.

HENCE we find, that in this remedy we possess, according to the circumstances of its application, a real stimulant or sedative power. The cold-bath may, under due regulation, be useful in two different diseases. A tendency to inflammation may be checked by the continued application of cold air or cold water; and it is here worthy our remark, that the young and healthful bathers, persons of full habits, and accustomed to high living, ought to be cautious in the use of the bath as a stimulant. They require cold as cold, and not with a view to its operation in producing heat. They should continue in the water for a longer space of time than invalids, and by a little attention they will soon perceive the duration required. Healthy swimmers and divers,
 who

who accustom themselves to continue long in the water, find a cool and refreshing effect from it, and if they do not continue too long they are strengthened; but a very trifling excess debilitates the strongest men. The medium should be studied. What would extinguish the living principle of one person may be salutary to another*. It is impossible to fix the precise degree of cold which may, or even ought to be applied as a remedy to different persons, under different circumstances; the sum of our observations is this:—The weaker the person, the more sudden should be the application of cold, to produce a stimulant effect. For the more suddenly the body is deprived of its heat, the more quickly will it recover it

* I find, on enquiry, that the bathing guides are really debilitated by their continuance in the water; and, notwithstanding their frequent recourse to spirituous liquors, they usually experience some ill effects from it, at the latter end of the season.

from

from the surrounding atmosphere. But if a sedative effect is required, the duration should be greater.—It will scarce seem necessary to enlarge on the other effects of cold, as what has been said will suffice to shew, that, as exciting salutary or moderating morbid actions, it will occasionally act as a tonic strengthening remedy. The astringent property depends, likewise, upon the general operation, and requires no separate consideration. The same may be said of a diuretic effect, observable by those who frequent the bath.

IN this investigation of the operation of cold, we only consider the water as the medium of application—the effects of it are the same, however applied. When the body is chilled by cold air, on its return to a warm atmosphere, the sensation of glowing warmth is perceived, and the stimulus of the re-entering heat is evident. But, if it is too sudden, a sense of pain is induced, as we perceive by warming
ing

ing our hands at a fire in the winter, when they have been half frozen with cold.

LAVATION in water is certainly the most salutary mode of applying cold, as we thereby get rid of impurities, which might prove the occasional cause of diseases; and, independant of this action, it seems to produce effect by its superior capacity for heat.—The gravity of sea-water has been supposed to produce specific effects, and the physicians of the mechanical sect endeavoured to explain the effects of cold-bathing on the principle of pressure alone; but as this opinion, with several others, equally futile, is now rejected, I shall not think it necessary to enter more fully into the subject. The specific gravity of the water may, with great propriety, be overlooked, as it affords no solution of the phenomena of bathing. The degree of temperature is the object of consideration, and deserves the minute attention of medical men.

IN

IN this enquiry I have not thought it necessary to enter at large into the doctrine of latent and sensible heat. Neither have I insisted upon the opinion of some philosophers, that the living body has the property of generating heat and cold in certain circumstances, when morbidly threatened with either. The experiments of Dr. Fordyce, Sir Joseph Banks, Dr. Blagden, Dr. Crawford, and Mr. John Hunter, put this matter beyond all doubt. But the fact does not appear to afford any aid to our present investigation, although it informs us, that violent excesses of heat and cold may be suffered with less impunity than we could have imagined.—The too frequent use of the bath, by habituating the body to a new stimulus, may prove prejudicial. Invalids should, therefore, be cautioned against it. Probably three or four times a week may not be improper, but the frequency must depend on contingency.

THESE

THESE are the observations which I have thought it necessary to premise, previous to the detail of my own experiments on the subject, which have been very numerous—But I shall only describe such as from their diversity or peculiarity may afford some elucidation of this obscure subject.

EXPERI-

E X P E R I M E N T S.

I.

BEFORE breakfast, my pulse 72° in a minute, I walked to the sea-water bath, and, after plunging over head, stood upright in the bath; which not being full, I immediately perceived a sense of glowing warmth over that part of the body which was out of the water, whilst my legs, and the rest of my body in the water, were painfully cold. The thermometer in the shade of the room 68°; in the bath 56*. On sitting up to the chin in the water for about two minutes, my pulse lowered to 66. On coming out of the bath, and putting on my cloaths, it beat 78. I then went up to the knees in the bath, and felt a chilly rigor over my whole body, and in three minutes my

* Farenheit.

pulse fell to 66 ; but on coming out again it rose to 72. Notwithstanding that I ate a hearty breakfast, on my return home I found myself chilly and cold, with a slight head-ach throughout the day, which I could not help attributing to this experiment.

II.

BEFORE breakfast I walked down to the sea-side, and counted my pulse before I undressed in the machine, which to my great surprise was 104 in a minute. Having had a bad night, and feeling very unwell, I was rather alarmed at this unexpected velocity ; but not being in a perspiration, I went into the water, and, after swimming a few minutes, attempted to count my pulse ; but, unluckily, a large wave overwhelmed me and my stop-watch. This accident interrupted the experiment. After dressing myself, I felt much refreshed, and, on walking home, found my pulse at 72.

I WAS

I WAS greatly invigorated by this experiment; and, from my previous indisposition, had reason to attribute the event to bathing.

III.

AFTER a good breakfast, pulse 78, I went into the cold sea-bath. The thermometer 68° in the shade of the room, and 61 in the bath. I walked in gradually, and sat up to the chin in the water, endeavouring to count my pulse at the wrist, but it was not perceptible; neither could I perceive the pulsations of my heart. Continuing in this situation near five minutes, with the same result, I plunged over head, and on coming out found my pulse 86. In a few minutes I returned to my former situation, sitting up to the chin in the bath; my pulse was again imperceptible: but on coming out, after remaining near fifteen minutes in the bath, it rose to 85, and I had a glowing warmth.—I repeated this experi-

F

ment

ment upon my servant, who was with me. His pulse 60, and full. I kept hold of his wrist. He complained much of the extreme cold, saying it was much colder than the sea. When he was up to the shoulders, his pulse was imperceptible at the wrist, temporal arteries, and the region of the heart itself. I still kept hold of his wrist, and as he walked slowly out of the bath, his pulse became gradually perceptible, and rose to 72. He re-entered the bath with the same result.

IV.

AT noon the thermometer 73 in the shade.

AFTER walking about half a mile on the beach, I undressed, and went into the sea. Pulse 96. Thermometer in the sea 66. Having found some difficulty in holding my watch and counting my pulse at the same time, I took a servant with me. After dipping once over head, I attempted to number my pulse, and that of the servant, but it was impracticable.

He

He shook excessively with cold, and my own pulse was imperceptible. After continuing about a quarter of an hour, swimming and diving, I felt myself fatigued, and walked to the beach, when I was surprized to find my pulse 110, and the servant's 120. He still continued to shake and tremble with cold, and his pulsations were full and soft, like a person in an ague fit.

WHEN we were dressed, I compared the velocity again, and found his pulse 100, my own 98. He was still cold and chilly. After walking gently home, and sitting still half an hour, my pulse was 78, the servant's 72. We were both weakened by this experiment, and I had a sort of trembling of the calves of my legs, which went off on eating.

V.

PULSE 96. I went into the sea fasting. After plunging over head, I returned to the machine immediately, and by placing

my hand upon the region of the heart, counted the pulsations 144. When I was dressed, pulse 72, I felt cooled and refreshed. Thermometer 65 in the sea. In the shade of the machine the thermometer was only 62; which is a curious fact, and deserves the attention of physicians. This degree of cold may probably be accounted for from the evaporation which takes place from the wet matts, floor, and towels. I have very often experienced a great chilliness during the time I continued in the machine, which could only be accounted for from this cause—that the sea was, in fact, a warm-bath, compared to the temperature of the air in such a place. The greatest caution is necessary on the part of the sick, and all invalids should have a machine perfectly dry.

VI.

BEFORE breakfast, pulse 72; thermom. in the machine 63 – in the sea 63—and in the shade, exposed to the wind, N. W.

*

only

only 60°; I applied the thermometer under my arm-pits before I entered the sea, and found it rise to 96.—When I was in the water I could observe no difference in the temperature of any part of my body, and that of the water; but being so unfortunate as to break my thermometer in this experiment, and not being able to procure another in this place, I am unable to speak with that certainty that I could wish on this subject. But I have reason to think, from my former experiments, that the thermometer will prove of the same height on the surface of the body that it is in the water.

AFTER swimming for some time, I returned to the machine, and found my pulse 140; which increased celerity I have frequently observed to be caused by the exercise of swimming, and from which circumstance I am induced to think, that it may become a salutary mode of using exercise in many complaints.

From

From these EXPERIMENTS we deduce
the following CONCLUSIONS.

1. THE cold-bath produces a powerful change on the moving powers.
2. IT produces a powerful effect, by altering the course of the circulating fluids.
3. THE action of the heart and larger arteries is weakened during the application of the cold-bath, but increased by its subsequent operation.
4. THE action of the smaller vessels is, likewise, consequently increased by the operation of the cold-bath.
5. DURING the application of the cold, the body loses a portion of its sensible heat, and the blood is propelled from the surface, and accumulated on the internal organs.

6. ON

6. ON the recovery of the sensible heat the vessels on the surface are stimulated, and the action of the heart and larger arteries is at the same time excited by the preternatural stimulus of the accumulated fluid.

7. THE operation of cold or sea-bathing resembles the effects of known stimulants. It checks * increased morbid actions, and increases morbid inaction †.

THESE are all the experiments which I shall subjoin—But I have tried, and still am trying many more.—A further elucidation, at present, appears unnecessary. I shall, however, always be ready to attend to the suggestions of the learned with due respect.

* Experiment II.

† Experiment IV.

F I N I S.

Just published, by the same Author,

AN ESSAY ON THE METHOD OF STUDYING
NATURAL HISTORY.

EXPERIMENTS ON A NEW SPECIES OF
BARK.

EARLY in October, Dr. KENTISH commences his Lectures on Chemistry, Materia Medica, and Theory and Practice of Physic ;

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A D V I C E

T O

FOURTY PERSONS,

B Y

DR. KENTISH.

G O W E R S T R E E T,

B E D F O R D S Q U A R E.

L O N D O N,

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other Bookfellers in Town and Country.

1 7 8 9.

Nodosâ corpus nolis prohibere Chiragra?

HOR.

A D V I C E
T O
GOUTY PERSONS.

TO detail the opinions of medical men on the generality of complaints, is at once an insult to their profession, and to common sense. No absurdity is too great for the creed of a physician. He who is orthodox in physic, must shut his ears to reason, and “listen with credulity to the “whispers of fancy, or the phantoms of “imagination.” I shall therefore be excused from pursuing the history of the Gout through all the labyrinths of obscurity, in

B which

which the ignorance of my profession has involved it, and enter upon the more important subject of giving such observations and advice to arthritics, as experience enables me to deliver. The theory of disease has been mistaken, and to such mistake we must attribute the fatality of medical practice. Since the days of Asclepiades,* there has been but little genius of philosophy in the writings of medicine. He corrected the errors of Hippocrates, and endeavoured to teach mankind the happy art of curing all complaints, *tuto, celeriter, & jucundè*. But such a doctrine was not suited to the capacity of the *medical mind*, which has been singularly attached to systems repugnant to truth, science, and common sense. Hippocrates was the unintentional cause of this calamity. He separated medicine from

* “Vixit Anno Mundi 3939. Anno Ante Christum Natum 63, & quidem ad supremam Senectam valetudine prosperrima. Nam sponsonem fecisse dicitur, ne medicus haberetur, si quo unquam morbo corriperetur. Et vicit etiam.” Vid. Mangeti Biblioth. & Le Clerc’s. Hist. de la Medecine.

philosophy,

philosophy, and sent it a wandering amongst the fictions of imagination. Any man who could read or write, and many a man possessed of neither of these accomplishments, has been, since his time, thought qualified to attend to nature—to watch disease, and record the symptoms of complaints—hence every morbid appearance has been dignified with some specific appellation, and the phenomena of disease multiplied into distinct diseases.

This talent for observation has been so widely diffused, that practitioners in physic appear to have been emulous of their minute attention to the diseased varieties of nature, without duly considering the peculiarities that attend her in a state of health. The properties of life, and the causes of health, till lately, have appeared beneath the physician's attention. Thus has the talent for observation been prostituted—Effects have been recorded, whilst causes have escaped notice. Hence the jumble—hence the chaos of medical composition.

The opinions of Hippocrates have been misconstrued, and his wise institutions subverted. When he entered on the study of medicine, he found so much to be done, and the field of improvement so large, that he declared it as his opinion, that it was impossible for any man to be thoroughly master of his profession who did not apply to it with unremitting ardor, and particular attention. “ Philosophy, (says he) “ has for its object the whole system of nature, but medicine has for its object the nature of man—his states of health and disease.” This was a judicious remark, but it gave rise to many errors.—For although Hippocrates himself expressly says, that “ Philosophy should enter into medicine, and medicine into Philosophy, “ and that a physician who is a philosopher, is equal to a God.”* Yet when once the profession became distinct, and the medical character was no longer connected with that of a philosopher, the healing

* Libro de decenti Habitu.

art ceased to be a branch of physics, and fell into the hands of men whose interest it was (as it now is) to deceive mankind, and make a mystery of the plainest truths. To this fatal separation may be attributed the present fatality of disease. And however shocking to the feelings of humanity it may appear, there can be no doubt but that the death of thousands, and tens of thousands, must be attributed to this parent error.

The man who ventures beyond the limits of those narrow prejudices which enslave his profession, never fails to meet the rancour of malevolence. But I will not complain. There are good and bad men in all ranks of society. There are skillful and unskillful persons in all professions. The good are not always happy, nor the skillful fortunate, in this world. They have, however, advantages peculiar to themselves; they possess a consciousness of superiority which the wicked

wicked and the ignorant know not. In all the disasters of human life ; in all the disappointments of professional pursuit, the good man and the skillful practitioner have the invaluable support of self-approved conduct ; they are prepared to render an account of their actions, and ever ready *publicly* to confute and confound their enemies.

Virtus, repulsæ nescia sordidæ, in-
contaminatis, fulgit honoribus ;
Nec sumit, aut ponit secures,
Arbitrio popularis Auræ.

HOR. Lib. III. Od. 2. 17.

The singularity of my medical opinions will be partially seen in this work. And when it is considered, that to be singular on a subject in which all other writers are confessedly in error, argues, at least, a possibility or chance of truth, the learned
 reader

reader will candidly attend to the arguments which are here delivered, and divest himself of prejudice to any particular party, sect, or system.

The disease, of which I am now to treat, is the confessed *Opprobrium Medicorum*—Self experience, practical knowledge, and attention to the symptoms of this complaint, from the earliest period of my life, are the apology and the proofs on which I rest the success of the present investigation.

I am an Arthritic, and the son of an Arthritic—I am interested in the cause which I have undertaken, and I labour to destroy a mortal enemy, the direful torments of whose destructive rage, the poet thus describes :

“ O Name, for ever sad, abhorr’d of Heav’n,
 “ Parent of groans, from dark Cocytus sprung,
 “ Immortal Gout ! in gloomy Erebus,
 “ Whom e’rst Megæra, dreadful fury, bore ;
 “ And from her poison’d breasts Alectho fed :
 “ What dæmon fraught with malice sent thee forth
 “ To

“ To rage o’er wretched earth and plague mankind ?
 “ If mortals for their crimes, committed here,
 “ Are doom’d to suffer in the realms below,
 “ Why offer Tantalus the elusive wave ?
 “ Why torture poor Ixion with his wheel ?
 “ Or bid the wretched Sisyphus uproll
 “ The still revolving stone ! consign’d to thee,
 “ And to thy tendon racking pangs, the guilty
 “ Had mourn’d a heavier punishment.”*

To lessen this punishment is the business of a physician. But as he who is ignorant of a cause, can stand but a bad chance to remove its effect, it is necessary that we make some attempt to ascertain the positive or proximate cause of Gout.—Any reference to the opinion of others is unnecessary—the ideas which I have borrowed will be detected, and those which are original observed.—As the principle of life has been misunderstood, it is no wonder that every morbid affection of that principle has been mistaken.—To be concise and explicit, I will deliver my doctrine of disease in a few general physiological propositions ;

* Vide Lucian’s *Tragopodagra*, by Francklin.

and

and such of my readers as think a knowledge of causes necessary to explain effects, will attend to this enquiry. I submit my opinions to the demonstration of intelligent readers.

PHYSIOLOGICAL PROPOSITIONS, containing a Philosophical View of the Causes of Life, Health, Disease, and Death.

PROPOSITION 1st.

L I F E is an adventitious property of matter, requiring the action of certain exciting, or capacitating powers to its maintenance and support.

PROP. 2d.

*The capacitating powers * of life are, food, air, exercise, heat, light, animal fluids, se-*

* Vid. the Non-naturals of Galen, and Exciting Powers of Brown.

C

cretion,

cretion, and excretion, sensation, reflection, and their consequences, the affections and passions of the mind, all operating on the nervous system, and producing the alternate states of watchfulness and sleep.

PROP. 3d.

The capability or aptitude for life, depends upon the due application of the capacitating powers.

PROP. 4th.

Health is the result of the due action of the capacitating powers.

PROP. 5th.

The predisposition to disease, and disease itself, are the result of an undue action of the powers of health.

PROP.

PROP. 6th.

In disease the agents necessary for the support of health, operate either with too strong or too weak an energy.

PROP. 7th.

The capacitating powers of health, increased to a certain degree, cause sthenic or inflammatory disease, and increased to a still greater degree, cause asthenic disease, or indirect debility, which may appear under a variety of forms.

PROP. 8th.

The powers of health abstracted or decreased to a certain degree, cause direct asthenic disease, or universal debility, which may likewise appear under a variety of forms.

PROP. 9th.

Every power causing idiopathic disease operates on the nervous system in a manner similar to the agents of health with a force above or below the natural standard, producing either direct, sthenic, or indirect disease, which state, according to degree, we term direct, sthenic, or indirect debility.

PROP. 10th.

That state of the human system which we term DEBILITY, is the real cause of all the morbid phenomena of idiopathic disease.

PROP. 11th.

There are three diversities of this debility, which constitute distinct idiopathic disease, and these are, the direct, sthenic, and indirect.

PROP.

PROP. 12th.

The true sthenic, or idiopathic inflammatory disease, is cured by an abstraction or diminution of the capacitating powers, or stimuli of life.

PROP. 13th.

Idiopathic asthenic disease is removed by the addition, or free use of the capacitating powers.

PROP. 14th.

Sthenic disease may become asthenic, and vice versâ.

PROP. 15th.

Idiopathic disease may likewise be combined with local affection, and vice versâ.

PROP.

PROP. 16th

Death happens from the excess or defect of the capacitating powers, and can only be produced by bodies acting upon the capability in a manner similar to the capacitating powers, or by some local destruction of parts necessary to the conservation of the CAPABILITY or general principle of life.

THE

T H E
H I S T O R Y
O F T H E
G O U T.

TO give an exact and compleat history of the Gout, is a difficult matter. The experience of a Sydenham, and the systematic genius of a Cullen, have elucidated the subject; but cases frequently occur in which this disease assumes a form which different practitioners would characterize by different appellations: and the
most

most profound physicians will confess, that they are yet unacquainted with the pathognomic marks of the disease. This remark indeed might, without injustice, be extended throughout nosology. But the digression is here inadmissible. I have commented upon the mutability of disease in another place, and the reader will be inclined to forgive my want of copiousness on this subject, when he is informed that physicians of the greatest practice in the present age, are unable to determine upon the symptoms which characterize the most common complaints.—A professor of Edinburgh asserts, that a pain of the right shoulder is a pathognomic sign of an inflamed liver; whilst a celebrated Physician of this metropolis affirms, that hiccough is the sought-for symptom. The same professor teaches that a diminution of the pulse in continued fevers is a good sign, whilst the same Physician asserts, that it is always a bad one. Since Doctors disagree, it will not be surprising that even in the short history which I am to deliver, such heterogeneous symptoms

symptoms may be mentioned, as shall incline the reader to suppose that my text has been overlooked, and that I am prating without a knowledge of my subject. But he who has laboured under severe attacks of the Gout, will have no difficulty in tracing the features of his old enemy in the following description, and though he shall vary like Proteus, he will recognize his actions under every type.

Various and acrimonious are the disputes which have arisen on the tenure by which we Arthritics possess our enviable possessions. Hereditary right has been denied us ; * and persons without pretending to this claim, have frequently possessed a large share of our privileges. One circumstance, however, is pretty well ascertained.—The ladies seldom inherit this patrimony. They do indeed sometimes possess themselves of it ; but the most learned in medical jurisprudence agree, that gouty possessions can

* Vid. Cadogan's Treatise.

only be entailed on the male branches of the family. In proportion as the females approach to the habits of men, they acquire an aptitude, or to speak in the language of phyfic, they become predisposed to the Gout. But it is remarked, that the female descendants of a gouty family, are commonly favoured with Pandora's blessings in some other peculiar form.—The stone and gravel, scrophula, hysteria, or violent nervous affections, are their wonted inheritance.—The females liable to the Gout, are those of the more robust and full habits, whose menstrual evacuations are more abundant than usual. Eunuchs are said to be seldom attacked with this disease, but indolence and full diet will give the predisposition in robust habits.

Some writers have observed, that the Gout particularly attacks men of large heads, full corpulent habits, and those whose skins are covered with a thick *rete mucosum*, which occasions a coarse surface.—The Gout varies considerably in its first attacks.
They

They are seldom frequent till after the age of five-and-thirty. But I have seen several instances of severe paroxysms in boys of ten or twelve years of age.

A paroxysm or fit of the Gout, according to the common acceptation of the term, is an inflammatory affection of some of the joints, attended with other peculiar symptoms. This inflammation sometimes comes on suddenly, without any warning; but it is more often preceded by several symptoms. —An unusual coldness, numbness, or sense of weight in the limb, frequent cramps of the muscles of the legs, an unusual turgescence of the veins, and a sort of prickling pain striking down the whole of the lower extremities, with the cessation of the ordinary sweating of the feet, when they are affected, take place.

Previous to these symptoms of the local-affection, the whole body is commonly affected with some degree of torpor and languor; the patient complains of lassitude,

loss of appetite, flatulency and nausea, prickling pains in the stomach or bowels, and head-ach, relieved by a discharge of wind, with costiveness, purging, or other marks of disorder in the functions of the stomach. These symptoms frequently continue for several days, or a week or two before the symptoms which constitute a real paroxysm, come on.

The attacks of a fit of the Gout are sometimes felt first in the evening, but it often happens that it commences suddenly about two or three o'clock in the morning. The first joint or ball of the great toe, is commonly the part first affected; but sometimes other parts of the foot are primarily affected, and as the paroxysm advances, the affection communicates to the instep, ankle, whole of the foot, and leg itself.

With the commencement of the pain, there is generally some degree of rigor or cold shiverings, which goes off upon the increase of pain, and is succeeded by heat,
thirst,

thirst, and more or less disorder in the natural, animal, or vital functions.

The symptoms of a gouty paroxysm bear a great resemblance to the attacks of fever; and if this affinity had been pointed out and insisted upon by physicians, we should probably long since have been possessed of a much more efficacious treatment in this complaint. The incipient paroxysm sometimes resembles a continued fever, but more commonly the remittent, or intermittent type.

The pain becomes by degrees more violent from the first attack, and continues commonly in this state with great restlessness and uneasiness of the whole body, 'till next midnight, after which it is observed to remit. In twenty-four hours from the commencement of the first attack, it commonly ceases, and on the coming on of a gentle sweat, the patient gets a little sleep; the pained part is now considerably inflamed, and somewhat swelled.

The

The pain, or as it may be properly termed, the gouty paroxysm, recurs in the evening, and with the fever, commonly continues with more or less violence till the morning. Such at least is the common progress of the disorder. And as the unhappy patient is taught to believe that his complaint is beyond the power of physic, the gouty paroxysm is commonly suffered to repeat its nocturnal attacks for a considerable length of time. The Hippocratic maxim that nature alone can cure all diseases, has been so universally received by medical practitioners, and gouty patients in particular, that patience and flannel are the only prescriptions which the first physicians of this age dare venture to order in this dreadful malady.

But I here maintain, to the honour of medicine, and in opposition to the received opinions of my profession, that a gouty paroxysm is as much within the compass of medical abilities, and as truly curable, as any other febrile paroxysm whatever. The
affinity

affinity just pointed out betwixt a remittent, or intermittent fever and the gout, first lead me to this conclusion, and the experience of private practice confirms the opinion beyond all doubt. In what this practice consists will make an important part of this work. At present I am to pursue Podagra thro' her Protean type, and when we have viewed the varied forms of attack, we shall sketch out a plan of operations; and according to the success of our enterprize, I shall desire to be judged.

It is said that “ when the disease after having remained for sometime in a joint ceases very entirely, it generally leaves the person in very perfect health, enjoying greater ease, and alacrity in the functions of both body and mind, than he had for a long time before experienced.”* But the truth of this remark is limited, and the observation favours of a vulgar error. For I appeal to those who have laboured under any severe attacks of the disease,

* Cullen cccclxxiv.

whether

whether or not they feel in perfect health on the cessation of pain. For my own part I can affirm, that my function of body and mind have been considerably impaired for a length of time after a severe gouty paroxysm. And experience inclines me to believe that this is commonly the case. It is true, indeed, that when a patient has laboured for a considerable time under those varieties of gout which we are about to mention, or been idiopathically indisposed previous to the attack of podagra or gouty inflammation of the foot, he will on the recovery from the paroxysm, feel much livelier, and better than he did before ;—the diseased action being removed from the stomach, and vital parts to the extremities, on its disappearance from which health ensues. Thus is the remark partially true, but generally false.

At the beginning of the disease the returns of it are seldom frequent ; once in two, three, or four years ; but after it advances

vances, the intervals become shorter, and at length the attacks are annual, or sometimes twice a year. Afterwards they recur several times during the course of autumn, winter, and spring. As the fits are very frequent, the length of the paroxysms is increased, and in the advanced state of the disease, the patient is seldom free from some gouty torment. The summer months afford him some relief, but much depends upon management.

In the progress of the disease several circumstances arise which deserve attention. At first one foot only is commonly affected; then both; and afterwards the morbid affection alternates, or changes its mode of attack. After the feet, * the hands, knees, elbows, wrists, or other parts of the upper and lower extremities become affected, and there are few joints of the body which escape without more or less of gouty action.

* According to the part affected, the complaint, in medical language, is termed Podagra, Chiragra, Gonagra, &c.

In this manner is the disease protracted for a great length of time, till nature, worn out by the severity of affliction, acquires a degree of insensibility, which proves a happy addition to the anodynes of patience and flannel.

When the paroxysms have become very frequent, the pains are generally less violent, but the patient labours under the distressing symptoms of irregular Gout, as sickness, loss of appetite, &c.

And after the attacks have recurred very often, chalk-stones, or concretions of a friable earthy substance are formed upon the outside of the joints, and for the most part immediately under the skin, which, in some cases, entirely destroy the motion of the joints, and cause ulcerated sores. In length of time likewise nephritic complaints supervene, and fits of the stone and gravel sometimes alternate with those of the Gout.

The

The description here given, will suffice to characterise the *regular Gout*, in whatever form it may appear. For the locality of the diseased action seems to form no specific difference, when the inflammatory affection is external.

Dr. Cullen has described the irregular Gout as it appears under three different states, which he names the *Atonic*, the *Retrocedent*, and the *Misplaced Gout*. And he observes, that as “ we suppose the disease
 “ to depend always upon a certain diathesis
 “ or disposition of the system ; so every ap-
 “ pearance which we can perceive to de-
 “ pend upon that same disposition, we still
 “ consider as a symptom, and case of the
 “ Gout.” * In the course of this work we shall endeavour to shew that if practitioners had attended to this observation, and reasoned in medicine, as philosophers do in philosophy, they would have attempted the cure of the Gout upon a very different plan

* Cullen's first lines. cccclxxi.

from what has been universally prescribed. —There are few physicians who cannot remove the Gout from the stomach, and yet there are few who think it practicable to remove it from the foot.

But if all gouty symptoms, as Dr. Cullen affirms, depend upon the same diathesis or disposition; and I maintain with him that they do, surely it is philosophical to say, that they are all to be cured upon the same plan; and as physicians are acquainted with the cure of one form, I affirm that the same cure under the directions hereafter to be given, is applicable to all the forms in which the Gout can possibly appear. This reasoning must be admitted, or logic and philosophy for ever separated from medicine.

The symptoms of atonic Gout are chiefly affections of the stomach, as loss of appetite, indigestion, sickness, nausea, vomiting, flatulency, acid eructations, and pains of the stomach, and abdomen. With these disorders

disorders in the *primæ viæ*; sometimes a costiveness, but more commonly a looseness, with colic pains occurs. The patient is afflicted with great dejection of spirits, and other nervous symptoms. Palpitations, Faintings, asthma, headaches, giddiness, apoplectic, and paralytic affections, are likewise not unfrequent.

If any extreme part has been affected with gouty inflammation, which has suddenly disappeared, and the symptoms we have described supervene (which is no uncommon case) the disease is named the *retrocedent* Gout. The misplaced Gout is nothing more than the atonic variety;—it is neither described nor defined accurately by Dr. Cullen; and though he is willing to make it a distinct species, yet he confesses he never met with any cases of it in his own practice, and that he finds no cases of it distinctly marked by practical writers, except that of a pneumonic inflammation.

There

There are likewise two other cases which the same author calls *translated* Gout; the one of which is “ an affection of the neck
 “ of the bladder, producing pain, strangu-
 “ ary, and a catarrhus vesicæ, or a mucous
 “ discharge from the bladder.—The other
 “ is an affection of the intestinum rectum,
 “ sometimes of pain alone, sometimes of
 “ hæmorrhoidal symptoms.—These mor-
 “ bid affections sometimes alternate, with
 “ inflammation of the joints. But whe-
 “ ther to refer those affections to the retro-
 “ cedent or the misplaced Gout, Dr. Cullen
 “ says, he will not presume to determine,” *
 Surely there can be no presumption in the case, and if there was any utility, the matter would be easily settled.—When the inflammation has first attacked another part, and afterwards removes to the neck of the bladder or rectum, there can be no doubt of its being a retrocedent Gout, and when it primarily attacks these parts, it is the true atonic Gout, which is synonymous with the misplaced.

* CCCCLXXXVIII.

Every case of Gout therefore, may be properly comprehended under the three species or forms of regular, atonic, and retrocedent.—The two last are always misplaced, and differ from the former, only in locality, not in essence.

The diagnosis, or distinction of Gout from other diseases, may be learned by observing the predisposition and other parts of this history—the parts affected, the exciting causes, its recurrence, and connection with the whole system, are likewise commonly sufficient to distinguish it from the rheumatism, with which it is most likely to be confounded. And there is one circumstance which deserves to be noticed amongst the diagnostic marks :—In acute rheumatism, the pain and fever continue, without abatement during the day.—In the Gout, as has been described, they commonly remit, or intermit, and recur in the evenings.

Thus

Thus much for the history.—I now proceed to deliver some truths, not commonly known, or sufficiently attended to, and this I do in the following

AXIOMS RESPECTING THE GOUT.

1st.

THE exciting causes of the Gout are excess or defect of the capacitating powers of life.

2d.

A continued excess of food, conjoined to indolence, is the most common cause of a tendency or predisposition to a gouty paroxysm.

3d.

A real paroxysm or fit of the Gout, may be caused by powers debilitating the constitution in a DIRECT or INDIRECT manner.

Sudden

4th.

Sudden exposure to cold when the body is overheated, weak liquors, acescent food, want of sleep, and violent evacuations, are instances of DIRECT debility.

5th.

Excess of heat, strong liquors, high seasoned food, violent passions, and venery, are examples of INDIRECT debility.

6th.

The direct and indirect causes of Gout, cannot operate by producing morbid matter, or a primary change upon the chemical contents of the animal fluids.

7th.

The change produced is of the living solid, and is a real DEBILITY, weakness, or loss of
F
tone,

tone, of vigor, or of strength, in the part affected.

8th.

The causes and cure of the Gout shew that it seldom or never puts on the form of STHENIC, *or actual INFLAMMATORY debility.*

9th.

A tendency or predisposition to the Gout may be prevented by moderating the excess, or increasing the defect of the capacitating powers, according to the nature of the threatened debility, whether it be direct, or indirect.

10th.

In the tendency to direct debility, an addition,—to indirect, an abstraction of the capacitating powers, is required.

A pa-

11th.

A paroxysm or fit of the Gout is to be cured by the same general means, under whatever form it may appear.

12th.

The removal or cure of a gouty paroxysm, depends upon the free use of the capacitating powers, and such medicines as are calculated to remove direct, or indirect debility.

T H E Physiological Propositions, and these Axioms, contain all that I judge necessary to premise on the peculiarity of my medical opinions in general, and of the theory of the Gout in particular;—the former may serve to illustrate the latter;—and the latter to elucidate the following

F 2

P R A C-

PRACTICAL REMARKS,

OR ADVICE TO

GOUTY PEOPLE.

I SHALL divide these observations into two parts.

1st. On Regimen, or the proper management of the capacitating powers. And,

2dly. On Medicine, or the use of particular remedies.

In the physiological propositions I endeavoured to give a philosophical view of the causes of Life, Health, Disease, and
Death.

Death. The utility of such enquiries will now appear.—I have maintained that the Gout is a disease, or morbid state of the living principle, caused by an excess or defect of the very powers which support life, and properly managed, produce health. These powers I have named the Capacitating Powers of Life, as they capacitate the organization or living principle, to perform the phenomena of life.—And it is in this place that I am to remark upon their management as best adapted to Arthritics.—These remarks may be considered as a demonstration of the two first propositions.

That life is an acquired or adventitious property of matter, is evident from the contingencies necessary to its support. The unorganized part of matter continues the same unchanged mass for years. And although life is perhaps extended farther than discovery has yet reached, we are undoubtedly surrounded by objects which have no properties of animated nature. The various classes, orders, genera, and species of
fossils,

fossils, continue the same state of existence by the principles of attraction and cohesion, whilst animal and vegetable life are destroyed by accidents, which cause only a bare separation, or division of parts, in the mineral kingdom. The limits of creation, it is true, are not marked by such nice bounds as the naturalist would describe.—

The powers of nature are uncontrolled, and the properties of life are variously modified. But wherever we are able to distinguish a living principle, we observe the necessity of certain conditions to its bare existence. Not to extend our observations at present to the various classes of animated and vegetable bodies, but to confine ourselves to a few remarks on the manner in which the life of our own species is preserved, we shall find an ample demonstration of our proposition.—

Not only meat and drink, but air and exercise, are absolutely necessary for our support.—Without a daily supply of food the body is weakened, and cannot long exist; deprived of air, we instantaneously expire; when we cease to breathe, we cease to live; without

without exercise, by which is to be understood all the various modifications of it, as motion, thought, and all the lesser exertions and actions, we cannot continue life. And however great the luxury of ease and repose may be, a state of exertion is highly necessary to the existence as well as the enjoyment of life.—Confine a man to his seat, and disease ensues; deprive him of the power of motion, and death indubitably happens.

The experiment is perhaps impossible, but if we may reason by induction, there seems to be no doubt, that a man bound in such a situation, as to be incapable of using any muscle, would soon expire, even though he was regularly supplied with food; the very digestion of which is not performed without muscular motion, as the peristaltic motion of the intestinal canal evinces. These considerations, therefore shew, that life is not an inherent, self-creating principle, but an adventitious property of matter, dependant

dependant on the actions of other bodies for its very existence.

FOOD, is one of the capacitating powers which deserves to be first considered. The Philosopher, the Physician, and the Arthritic, are equally interested in an enquiry into its effects. From the earliest period of medicine, practitioners have paid attention to its nature, and endeavoured to ascertain its specific properties. But false theory has influenced their researches, and instead of practical discovery, we find little more than vague conjecture, frivolous experiment, and useless speculation in the medical writings, ancient or modern, upon this subject.

HIPPOCRATES, it is true, has paid great attention to the nature, qualities, and effects of food ;—he has left three books expressly *περί Διαίτης*, one *περί Διαίτης υγιεινῆς*, and another, *περί Διαίτης ὀξέων*. He has likewise touched upon the subject in his Aphorisms, and other parts of his works ; but the doctrines of *hot, cold, dry, and moist*, have
so

so perplexed his writings, that we can gather little medical information from his researches. His remarks however, must be viewed as those of a great genius and diligent observer.—He has given a very enlarged view of the different kinds of food used in his time. And the antiquary and physician will find equal amusement in the second book *περί Διαίτης*. In addition to the common viands of beef, veal, mutton, lamb, pork, &c. the ancient inhabitants of Greece used the flesh of horses, asses, dogs, and foxes. They likewise ate several species of fish, and marine animals, no longer admitted into our bills of fare. Their vegetables were very numerous, and they had wine of different sorts, which the father of physic frequently prescribed to the sick. He has left some judicious observations upon this subject, which have been strangely overlooked.

The observations of many of the ancients were directed to discover specifics in diet, as well as medicine. Hence the par-

ticular parts of animals, or singularly shaped vegetables, were not unfrequently supposed to be endued with medicinal virtues, and prescribed as proper food for the sick, from the resemblance they bore to the part affected. The kidneys or livers of animals were prescribed in disorders of the liver or urinary passages, &c. And among the vegetables, we have liver-wort, heart-wort, &c.

The present age gives no countenance to such doctrines; but the errors of modern opinion are probably not less absurd. Many physicians maintain that vegetable diet is best suited to the nature of man; and they contend that it contains more real nourishment than that of animals. Buffon has thrown considerable light upon this subject, and is a powerful advocate for the opposite opinion. But, as if it was the fate of physic to quarrel with her parent philosophy, and lose the sight of truth, the pen of opposition has lately been taken up by Andrew Sparrman, M. D. Professor of Physic at Stockholm,

Stockholm, who has taken occasion in an account of a voyage which he made to the Cape of Good-Hope, * to arraign this opinion.—But he has evidently mistaken the argument; and though he may have detected the errors of a naturalist, he has not invalidated the opinion of the philosopher.—M. Buffon's assertion seems to be founded in fact; and we agree with him, that “were man reduced to the necessity
 “ of living on bread and vegetables alone,
 “ he would scarcely be able to support life
 “ in a weak and languishing condition.”

A very little attention to the effects of diet in common life, will confirm this doctrine. And a mixture of vegetable and animal diet, is undoubtedly best adapted to the general state of man.—His anatomical structure confirms this opinion. To the Arthritic therefore it is necessary that the fact be known.—And, if I am right in the cause which I have assigned to all gouty

* Vid. Sparrman's Voyage to the Cape of Good-Hope. Vol. II. p. 227, &c.

phenomena, it follows that a strict vegetable diet is generally prejudicial to the gouty habit; experience corresponds to this remark, and, however strenuously the advocates of morbid matter may oppose the fact, I must caution my gouty patient to beware of false theory, and attend to his own feelings. Where a predisposition to the Gout arises from excess of high living, as it is called, or an abuse of the capacitating powers, a diet consisting chiefly of vegetables, and little or no fermented spirit, may correct the predisposition, and prevent the paroxysms; but under the pressure of any gouty symptom, such diet would be improper. If, therefore, an Arthritic is given to excess of eating or drinking, which is sometimes the case, I would caution him against such abuse, and recommend him in the intervals of a fit, to prefer a vegetable diet; or, at least, to intermix the use of vegetable, and animal food. But this must be done with caution, and the experiment made at a time when he is entirely free from every gouty symptom. Milk, is very properly
 joined

joined to the use of a vegetable diet. But I have seldom found it agree with gouty habits. I shall not enter into a minute examination of the specific properties of food, but sum up my observations on this capacitating power, with a few general remarks.

In a fit of the Gout, it is absolutely necessary for the patient to abstain from every kind of raw vegetable, and confine himself principally to an animal diet. Where solid food cannot be taken, broths are proper, and eggs raw or boiled, agree very well. Bread, and flour puddings, may be allowed; but should not make the principal part of a meal, when more strengthening diet can be taken. All the common culinary vegetables, as cabbage, spinage, broccoli, turnips, carrots, or potatoes, &c. ought to be abstained from. The latter seem to approach the nearest to animal food, and do not always disagree with gouty habits, but they should be used cautiously.—The warm, pungent aromatic vegetables, which enter into our culinary list, as condiments,

or

or seasonings, are very useful, and may be used freely. Mustard, pepper, ginger, nutmegs, cloves, &c. assist the powers of digestion, and invigorate the *primæ viæ*, when taken in proper quantities. Common salt* is likewise a powerful, and useful stimulus to the organs of digestion, whose functions are apt to be impaired in every case of Gout. *Acids* of all kinds should be avoided. The use of pickles prepared in vinegar, is consequently hurtful. The common beverage in and out of a fit, should be nearly the same. A weak mixture of spirits and water, generally agrees the best with gouty people; but wine and water, or malt liquor, are very proper, where they do not produce flatulency or oppression of wind; and wine alone may be used; but some preference is to be given to the nature of the spirit, and the sort of wine. Brandy is generally preferable to rum; and where the flavour of geneva is not disliked, it commonly agrees

* Vid. My Essay on Sea Bathing.

very well, and proves a good *carminative*. Good old port agrees with English constitutions better than meagre wines; but in a gouty paroxysm, I find Madeira, sherry, or good Lisbon, preferable to the red wines. Astringent liquors increase the thirst, and clamminess of the mouth, which accompanies fever; and weak acid wines debilitate the stomach. Claret, Burgundy, red and white Champaign, or other French, Rhenish, or Spanish wines, are either improper, or inferior to Port. Great caution is necessary on the part of the sick, not to overload the stomach with too large quantities of either solids or fluids. A physician may point out the kind, but the patient must determine the quantity. More is to be feared from excess than defect in this particular. A gouty person should never overload the stomach. In a fit, the stomach should never be suffered to be long empty. I would advise all Arthritics to attend particularly to this circumstance, and take a small quantity of food, every three or four hours; even a crust of bread now and then, is useful.

useful. The quantity, as well as the quality of the food, should be attended to, by the patient. Although he should not suffer his stomach to be long empty, yet he should be careful to take but little at a time. Dinner, should be his principal meal; and his hour of dining should be so contrived, that he may use exercise before and after eating.

The habit of sitting still, from dinner to supper, is highly prejudicial. Gentle exercise promotes digestion; it is therefore salutary after dinner; but the more violent kinds of exercise impede the digestive organs, and are only to be used in the morning, or with an unloaded stomach. To conclude this article, we may observe, that in a gouty paroxysm, the diet ought generally to be of a much more stimulant nature, than in the intervals of a fit.

AIR, is one of those capacitating powers, which is so necessary to our very existence,
that

that we cannot bear its suspension even for a few moments, without the most imminent danger. Late experiments have thrown considerable light upon the nature of respiration. Philosophers are of opinion that something noxious to the living system is thrown out of the body by this process. Dr. Priestly thinks this noxious matter is *phlogiston* ; Dr. Crawford has adopted the same idea, and attempted to prove that something is likewise taken into the system as well as thrown out. He has very ingeniously endeavoured to prove that the matter of heat is received from the air in the lungs ;—hence he makes respiration the fountain of animal heat ; and it must be admitted, that many facts confirm this philosophic theory. Air is to man, what water is to fishes. The fluid which we breathe is a particular species of air ;—probably the most abundant, and, 'till lately, supposed, the only invisible, permanently elastic fluid. The atmosphere, or general volume of air which surrounds our globe, is abundant in almost every other kind of air, and may

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be

be viewed as a menstruum, which contains chemically, or mechanically dissolved, various heterogeneous bodies. The vapours, indeed, with which it is impregnated, may be considered as compound solutions of all the bodies in nature. Hence it is worthy of observation, that the common air which we breathe, will constantly partake more or less of the local situation where we live. Its salubrity depends upon a variety of circumstances. Its temperature will form one of its primary characteristics. Heat, so far as it tends to promote solution, will affect the menstruum, and will likewise produce its own peculiar effects on the system.

These observations will suffice to convince Arthritics, that a pure atmosphere is salutary to them, as well as to other persons. They ought not to confine themselves to close, hot rooms ; but in a fit, and out of it, constantly to accustom themselves to breathe a pure, uncontaminated air.

EXERCISE will prove the best means of enjoying the advantages of the former power,
and

and is the grand preservative against the Gout. The different forms in which it may be used, are not necessary to be mentioned. Sydenham recommends riding on horseback as a sovereign remedy, but Walking, is perhaps, the best method of using exercise, when the feet are not affected. I never knew an Arthritic who was a great walker, that suffered much from the complaint. But I know many who use constant and violent exercise on horseback, and in carriages, and yet are much afflicted with the Gout. It is here worthy of observation, that as the extremities are the parts most liable to be affected, particular attention should be paid to their state. The action of every part should be properly excited; and if debility or loss of tone in the muscular fibre be the proximate cause of the Gout—whatever duly stimulates, and restores the lost tone, will remove the debility, and consequently the symptoms of gouty affection. Motion, therefore, is peculiarly adapted to this end. The joints of the extremities, as they are most liable to lose their proper action, ought

frequently to be exercised. I would advise Arthritics to attend to this remark, and accustom themselves to move the joints of the toes, fingers, wrists, ancles, knees, elbows, &c. constantly. This may be done by the most sedentary persons, and when the weather, or general state of the body prevents a better exercise, this salutary practice should not be neglected. I am even of opinion, that a slight inflammation of a joint may often safely be removed by this means. The local affection, it is true, is generally a symptom of the idiopathic, or general morbid state; but such symptom may happen to be protracted by the state of the part, or an injured locality; which is probably the reason why the gouty inflammation attacks one part, one foot, or one hand, for instance, in preference to another; and in such cases the part itself becomes an object of medical attention—to restore its vigor, or remove its debility, is to remove the disease; local applications may therefore assist the general treatment; exercise of the part is perhaps the best application

plication in many cases. It is a custom in the East Indies to have all the joints of the body frequently exercised; it is considered as conducive to health, and highly luxurious:—a person is employed to perform this office, and gently pinch or beat the arms, thighs, legs, and large muscles. This gentle stimulus, thus universally applied, is said to be highly grateful and salutary. It is continued so as to produce sleep; and from this circumstance, I would infer that Arthritics may expect relief from an adoption of the practice in this country. The effect of exercise is sleep, and to a gouty man, such effect is truly desirable.

The use of a flesh-brush is to be recommended on the same principle.

HEAT, and COLD, as different degrees of the same power, are properly treated of together, and equally deserve the attention of Arthritics. A summary of the received opinions on this head, cannot fail of being interesting to every man of science. I shall, therefore, take the liberty of presenting

ing the reader with an extract from a former publication of mine on this subject.

“ In reasoning upon this subject, we must attend equally to the facts of chymistry and physiology.—By the former we learn, that cold is only the negation of heat. By the latter we know that the living body cannot exist without a certain proportion of this universal principle, which pervades all nature, and is the efficient cause of animation, vigor, and all the phenomena of life. The organized and unorganized parts of matter alike acknowledge the universality of heat : by its operation, order and uniformity in appearance is maintained : by its excess or defect, the mode of existence is altered, and annihilation frequently ensues the slightest deviation in degree : solids become fluids, or *vice versa* : vegetables and animals cease to live in extremes of this grand agent of nature ; but they have the singular property of retaining their natural temperature in very great excesses of heat or cold. The temperature

perature of the human body is asserted to be 97° of * Farenheit, and the degree of external heat fixed upon by philosophers, as the standard of health, is 64° of Farenheit. Every continued deviation from this standard is supposed to produce a morbid change on the human body. An excess has been said to act as stimulant, and a defect as sedative. But great confusion has entered the arguments of physicians on this subject. Some have maintained, that heat being positive, and cold negative, the former must have one uniform action, in opposition to the latter; and as heat, in one instance, is a positive stimulus, so in every instance, whether above or below the standard, it is still a stimulus, and must produce, though in a lesser degree, the same stimulant effects;—others affirm, that heat below 64 or 60° of Farenheit, is always a sedative to the action of the living powers. But the dispute is of words, and the con-

* Vid. Gov. Ellis's Paper, Phil. Transf. vol. iv. p. 755. et Mem. de l'Acad. année 1764.]

clusion

clusion is the same in both cases. By a lesser stimulus, the former mean what the latter intend by the word sedative. Hence we find, that it is universally agreed among physicians, as well as philosophers, that the properties of heat are stimulant." *

The application of this doctrine of Heat and Cold is, that in the Gout, as well as in every other morbid or healthy state of the living fibre, a long continued excess or defect of either, is prejudicial to life; any permanent deviation from 64° of Farenheit, is therefore to be guarded against. It is necessary however to remark, that warm climates are found to agree better than cold ones with arthritics, which shews that they bear an excess better than a defect of the natural standard. But this is not always the case. I have observed hot weather in this country to disagree with gouty habits; and I have seen instances in which it was necessary for Arthritics to prevent the relax-

* Vid. Essay on Sea-Bathing, p. 47, &c.

ation of hot weather, during the summer, by cold-bathing, and cool air from the sea, or mountainous countries. I would therefore advise Arthritics, who can afford the expence of travelling, to pass the cold months in a warm, and the hot months in a cool climate. The temperature of the summer season is seldom too warm in this kingdom; but it is often too cold for very gouty people. The southern parts of France, and some parts of Italy, are recommended by physicians; but where the journey is inadmissible, I would advise attention to the changes of the season in the climate where the Arthritic is compelled to reside. Additional clothing is necessary to guard against the effects of cold; and an habitual exposure to all seasons in the intervals of a paroxysm, when the weather will permit, is the surest means of ensuring health.

LIGHT, as an effect of heat, deserves to be mentioned; but it will be unnecessary to enlarge on the subject here. In some countries the effects of light demand the

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particular attention of physicians. In hot climates, as in the East and West Indies, exposure to the rays of the sun, is productive of the most fatal diseases. Authors relate that the Coup de Soleil produces phrenitis, fever, &c. *—Arthritics, as being very susceptible of diseased actions, should therefore be cautious in avoiding the impressions of strong light as independant of the heat with which it is conjoined, it has indubitably a very violent stimulant effect. I know several persons on whom light acts as a sternutatory; they cannot look at the sun without being thrown into very violent sneezing.

ANIMAL FLUIDS. When gouty people recollect that the fluids are prepared from the food they use; and when they are informed that an excess or defect of the general mass of fluids produces a general change on the solids, or moving powers of the living system, which change, as far as

* Vid. Dr. Moseley's Treatise on Tropical Diseases.

it is a deviation from health, can be nothing more, than a debility or loss of tone, or loss of vigor, and as that debility appearing under the form of direct, or indirect, gives rise to all the phenomena, or symptoms of Gout, it follows that the quantity of animal fluids becomes an object of their attention. To direct the regulation of the quantity, it is necessary that we say a word or two respecting the nature of

SECRETION and EXCRETION. It is not required that the Arthritic has studied physic, to understand what it is his interest to know on this subject. Secretion and excretion are offices performed by different parts of the animal œconomy for salutary purposes. The first consists in separating what is useful; and the second in throwing out, or separating for the purpose of being thrown out, such parts of the fluids, as if retained, would prove noxious to the living system.

The former office we must leave to the direction of nature. The latter falls more immediately under our observation. Arthritics should cautiously avoid any excess or defect of excretion, or the quantity of excreted matter thrown out of the body. They should regulate with nice attention the state of the organs of digestion, and take care that they are not impeded by the retention of useless fæces, nor debilitated by the hasty expulsion of what ought to be retained. Purging and costiveness are equally improper to gouty habits. The body should be regularly kept open : and I have observed that a lax habit in the intervals of a paroxysm, is often necessary. One, two, or three motions, daily, without purging, appear requisite. The quantity of urine will generally be regulated by the quantity of liquids. Profuse evacuations by sweat should be guarded against, and a proper perspiration kept up by warm clothing and exercise.

These

These are all the observations which appear to be necessary on the subjects of Animal Fluids, Secretion and Excretion, as objects of attention to Arthritics. We now proceed to treat of

Sensation, Reflection, and their Consequences, the Affections and Passions of the Mind.

Medical metaphysics may be considered as an uninteresting subject. Anatomy has displayed the wondrous fabrication of the organs of sense, and physic has attempted to explain the phenomena of disease, from the direct influence of an intelligent immaterial spirit.—The system of Staahl, was of this kind; But the principles of his doctrine are incompatible with medical or metaphysical facts.—And medicine must in this, as in every other branch of her pursuits, have recourse to philosophy for an explanation of phenomena.

“ Physic of Metaphysic begs defence,
“ And Metaphysic calls for aid on Sense.”

POPE.

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The reasonings of Locke have elucidated the subject before us, and to him we are indebted for a system of logic which exhibits a view of the inlets of knowledge, and the operations of the mind. But there is still room for the pen of physic to arrange and elucidate the science of ontology, for the purposes of medicine.—It is often in the power of medical practitioners to regulate the mental as well as the corporeal actions. As all our ideas are derived from sensation and reflection; and as our ideas themselves sympathize with the state of the body, it is the business of a physician to regulate the inlets of knowledge, and by an attention to the organs of sense, to prevent, as far as in his power lies, the ill effects of dangerous impressions, or to remove, if possible, the causes of every morbid, mental emotion. In acute diseases, practitioners have observed the necessity of this attention, and by excluding the causes, have prevented the effects of hurtful sensations, and injurious reflections. In fever, the patient is kept from strong light, and violent noise.

noise. The organs of sight and hearing are consequently undisturbed, and that combination of prejudicial ideas, which would have been the result of violent impressions, is prevented. In a paroxysm of the Gout, the same practice is commonly adopted. But we ought not to rest contented with an injunction of this kind during a paroxysm. We ought to caution Arthritics from the improper admission of any ideas which may be destructive to their health and happiness. I could here adduce innumerable instances of violent protraction of gouty symptoms from such a cause. All the passions of the mind appear to act on the same general principle. They operate like other capacitating powers by empowering the principle of vitality to perform its office, and produce its peculiar phenomena.—In excess or defect, they produce disease. Our attention therefore is properly directed to those two morbid states, and we must attempt to increase or diminish the effects, as occasion requires.

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When any passion, by whatever name it is called, whether Love or Sorrow, or Joy, &c. proves too violent, or arrives at that degree which produces disease, we must seek to lessen its effects, and substitute a new stimulus. Medicines of the tonic class, may sometimes be serviceable, and should undoubtedly be employed in those cases, where nervous irritability lays the foundation of inordinate mental action; but commonly the most effectual remedy will be a different passion or affection of the mind, which places the ideas in a new train.—Thus, when love sinks into contempt or hatred, its morbid effects cease.—If Joy is excessive, and threatens danger, mingle it with grief or sorrow, and its bad symptoms disappear.—If the mind is oppressed with despair, call in the assistance of hope, and every gloomy affection will give way.—By thus tempering the passions, we have it often in our power to regulate the reflections, affections, and moral conduct of our fellow-creatures.

After

After having observed that Arthritics should cautiously abstain from the improper use of any of the passions, it may appear unnecessary to particularize ; one remark however is necessary to be made. Venery is singularly productive of gouty symptoms. I have known several severe fits from this exciting cause ; and so evident was the connection of the cause and effect, that the patient himself, has often made the observation. A very particular friend of mine, who is a very strong man, but of a gouty diathesis, assured me, that a very smart fit, from which he is now recovering, was, in his own opinion, brought on by this cause ; and he recollects the same thing to have happened before.

As all violent emotions of the mind, whether accompanied with corporeal exertions, or otherwise, are improper for gouty persons, so it is necessary here to observe, that intense application to business or study, should be guarded against, and such employments as oblige the pa-

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tient to lead a sedentary life, should likewise, as far as possible, be avoided.

Having thus gone through the remarks I proposed to make on the proper use of those powers which, improperly used, I maintain to be the sole causes of every form of Gout; I shall take my leave of this part of my work, with a few observations on the two states, under which the principle of life must always appear—viz.

WATCHFULNESS and SLEEP. Every living body must always be either awake or asleep. In the instances of suspended animation, the body may be viewed as in the latter state. The phenomena of returning life shew no specific difference in the two states. The duration and alternation of these forms of life, therefore deserve the attention of Arthritics. Man cannot exist in a state of health, without his share of sleep. The most active mind joined to the most vigorous body, must consent to a periodical annihilation. Labour must be succeeded

succeeded by rest, and slumbers will ensue the exercise of the brightest mental, or corporeal faculties. Arbitrarily to fix the portion of sleep, and prescribe the limits of those two states of non-entity, and activity, to which all human beings are subject, would be an arduous attempt without a probability of good. The gouty man should not suffer any part of his body to be long in a state of inactivity. Consequently the indulgence of much sleep is improper, and an excess of watchfulness is preferable. The hours of sleep should, in our own climate, be confined to the night; but in hot countries the heat of the day demands the cessation of all exercise, and inclines the body to rest. The custom of sleeping after dinner, should be avoided, unless in those cases where from pain or incidental irregularities, the usual share of sleep has been denied during the night. I shall close my observations on this head with an old English adage,

“ Early to bed, and early to rise,

“ Makes a man healthy, wealthy and wise.”

Here I conclude the first part of my advice on the REGIMEN of Arthritics, and proceed to my second general observation on MEDICINE, or the use of particular remedies.

By a proper management of the capacitating powers, the disease itself may be avoided. But when it is present in a violent form, relief is to be sought from medicine. And I have ventured to assert, that the Gout is a curable disease. The removal of a paroxysm or fit, is as much within the province of a physician, as the removal of any other paroxysm or fit whatever. The mistaken prejudices of mankind long prevented the speedy cure of intermittents. And the doctrine of morbid matter still prevails to the exclusion of a curative attempt in the Gout. But I will rest my argument on incontrovertible principles. I argue from analogy and experience. Sydenham himself admits the mode of reasoning which I adopt; and although his false theory prevented the use he might otherwise have made of his sagacious observations

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on the nature of disease, yet he expressly admits the analogy of an intermittent and gouty paroxysm in the following words :

“ Quod et in febrium intermittentium
 “ paroxysmis usu venit, quas ob eandem
 “ causam remediis non appugnamus, nisi
 “ æstu prius consopito. Nec absurdius
 “ quis in extinguendis harum febrium ca-
 “ lore scilicet, siti, inquietudine, aliisque
 “ symptomatis anxie operam locaverit,
 “ quam existimaverit alius se podagram
 “ sanare, cum in podagræ symptomatis
 “ tantum coercendis laboret : quam tantum
 “ hoc tempore a curatione morbi abscedat,
 “ ut eandem aliquatenus impediât ac remo-
 “ retur. Quanto enim magis ægri dolores
 “ lenit, tanto magis humorum concoctioni
 “ adversatur ; quantoque claudicationem
 “ arcet, tanto materiæ morbificæ expul-
 “ sioni officit.” *

Now, as the improved experience of the present age informs us that an intermittent

* Sydenhami Tract. De Podagra, p. 47r.

paroxysm may be safely cured at the onset, and as the doctrine of blocking up morbid matter in the ague, is nearly exploded, and no longer prevents the free use of bark, and other tonics adapted to the cure of the complaint, let us attend to the facts we have acquired, and derive the benefit of discovery by analogical application. If we can find a remedy for the Gout, equivalent in effect to the use of bark in intermittents, let us not be afraid of blocking up what does not exist, or of counteracting, when we have it in our power, to aid the efforts of nature.

To enumerate all the remedies which have been tried in this complaint, would be an useless and laborious task. Their number and inefficacy are finely described in the following lines :

—————“ Since man
 Was first created, hath he rashly strove,
 But strove in vain, with ev'ry fruitless art
 To check my conquest, and elude my power.
 Whilst

Whilst some their plantane, and their small-
age bring,

Lettuce, or purslane, horehound, nettles
sharp,

Fen-gather'd lentiles, or the Persian weed,
Leeks, scallions, poppies, hen-bane, or the
rind

Of ripe pomgranate, frankincense, and flea-
wort,

The root of potent hellebore, or nitre ;
Some steep'd in wine, the husks of beans
prescribe,

Or spawn of frogs, a sovereign cataplasm,
Carrot or pimpernel, or barley flour,
Or gall of cypress tree, the healing dung
Of Mountain goat, or still more fetid man.
Colewort, or gypsum, or the well-ground
sand

Of * Asia's pow'rful stone, with bean flour
mix'd.

Others, sagacious tribe, call in the aid
Of weasels, toads, hyænas, ruddocks, stags,

* The Lapis Assicus. Ex Asio lapide, says Dios-
corides, sit podagris cataplasma, cum fabæ lomento.

And

And foxes ; ev'ry metal, and the tears
 Distill'd of every tree ; bones, nerves, and
 skins

Of ev'ry beast, milk, urine, marrow, blood.

A potion some of four ingredients, some

Of seven or eight prefer. Some oft repeat

The sacred bitter ; some to the pure spring

Medicinal, whilst others trust to charms,

And incantations, which the wand'ring Jew

Hath ever ready for his gaping throng.

Mean time I laugh, and bid the fools go
 weep,

Who mock me thus, and but incense my
 rage." †

It will be unnecessary to comment upon
 this list of remedies, to which considerable
 addition has been made since the days of
 Lucian. But the increase is of number,
 more than of efficacy. I shall therefore
 rest contented with a few observations on
 the most common or most powerful medi-
 cines now in use.

[† Lucian's Tragopodagra, by Francklin, p. 582. V. II.

BLISTERS. In the *misplaced* or *retrocedent* Gout, they may be employed with effect. But in the regular paroxysm, they are seldom necessary; and even in cases where they are highly useful, care should be taken to avoid certain ill consequences, with which their use is sometimes attended. I have known a blister betwixt the shoulders, or upon the breast, relieve a gouty affection of the lungs, and bring on a severe gouty attack of the neck of the bladder, which was so different from the common strangury; that it was rendered worse by large draughts of diluting liquors, and only removed by hot brandy and water, aided by a remedy hereafter to be mentioned. Blistering the lower extremities may sometimes be proper in cases of atonic Gout, where the seat of the disease is not fixed.

ISSUES, or perpetual blisters, have been recommended, and I have seen good effects from a discharge long continued;

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but such discharge is seldom necessary, and in some instances might be prejudicial.

EMETICS are sometimes useful in removing symptoms arising from foulness of the stomach, but their use in this respect is limited. Nausea and sickness depend oftener on the weakened tone of the organs of digestion, than on any collection of indigestible matter in the *primæ viæ*. Emetics, therefore, should be used with caution. But I am of opinion that in some spasmodic gouty affections, particularly of the lungs, they act as powerful stimuli, removing the local diseased action, more effectually than other remedies more commonly employed.

PURGATIVES are only proper to prevent costiveness, and are now very properly decried in all gouty cases. But Arthritics should keep the body open by the use of some warm cathartic. The compound tincture of senna, or spirituous tincture of rhubarb, will commonly answer this purpose. A table spoonful taken at bed-time,
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in a glass of water, or pepper-mint water, with or without a few grains of powder of Rhubarb, is often a sufficient quantity, and may properly be repeated once or twice a week, or as occasion requires. The tone of the stomach and intestines, will be increased by the proper use of such a remedy.

BLOOD-LETTING, is an evacuation seldom to be admitted in gouty cases. But I will not venture to affirm that it is always improper. In some instances of violent Gout of the lungs, or head, I have known it give instantaneous relief, and no bad consequences ensue. The patient was plethoric, and the remedy probably acted by removing the excess of stimulus upon a part labouring under indirect debility. But except in these two cases of gouty inflammation on the membranes of the head or lungs, I never saw any good, but on the contrary much harm from the use of the lancet. And even in such complaints, I would never recommend blood-letting, unless in very plethoric habits.

STOMACHIC MEDICINES. Instead of evacuating remedies, it is evident that the cure of the gout must be sought for in the opposite list of tonic stimulants, or such articles of the materia medica as are calculated to remove debility of the digestive organs. The cure of intermittents was long and vainly attempted by every species of evacuation, 'till at length the Peruvian bark was discovered to produce a cure without this effect; and physicians now find that medicines acting upon the same general principle, are best adapted to the cure of those complaints which by analogy are supposed to depend upon the same general cause. Hence it is that the BARK and BITTERS are universally employed in diseases of direct debility. These remedies have been given to gouty persons in the intervals, or at the declension of a paroxysm. And although I am of opinion that they may be safely employed in a fit, yet I have never been able to remove a real external gouty inflammation by their use. As the bark itself is not always a sufficiently powerful

powerful stimulus to remove an ague fit, so it seems to be in most cases too weak a stimulus for the removal of a gouty paroxysm. I would however advise its use, conjoined to other remedies, and particularly in the intervals of a paroxysm. I agree entirely with a worthy divine, who, to the honour of himself, and the disgrace of physic, has written the best book now extant on the Gout. “ As indigestion, “ (says Dr. Warner) hath been proved to “ be the primary cause of the Gout, the “ first direction of medicine, it is natural “ to require, should be to strengthen the “ digestive powers. To this purpose, I “ believe there is nothing more efficacious “ within the compass of physic, than a “ frequent and almost daily use of the tincture of the bark, and of the elixir of vitriol, already mentioned at the declension of the fit.” *

* See a Treatise on the Gout, by Fred. Warner, L L. D.

A large spoonful of Huxham's tincture of bark in a glass of pepper-mint water, or camomile tea, with four or five drops of elixir of vitriol, is a very good stomatic medicine. But I have found that an infusion of the *cinchona caribbæa*, a new species of bark, which I have described in another work, under the name of *Cinchona Sanctæ Luciae*, is preferable to any preparation of either the common or red bark.† The following prescription may be of use to Arthritics :

Take one dram of the *cinchona caribbæa*, in coarse powder, or bruised : one dram and an half of dried orange-peel : one dram of Winter's bark, put them into an earthen pot—pour upon them one pint of boiling water—cover the top of the vessel ; and when the ingredients have infused four hours, pour off the liquor for use. A wine glass of this infusion with, or without a tea-

† Vid. My Essay on a New Species of Bark, &c.

spoonful

spoonful of Huxham's tincture of bark, will be found an useful stomachic medicine, and may be taken two or three times a day.

The dried orange peel is an excellent and grateful bitter. It covers the stronger taste of the *cinchona caribbæa*, and renders the whole a pleasant medicine.

COLUMBO ROOT is likewise a very useful medicine in gouty cases. A similar infusion to what is prescribed above, with double the quantity of columbo root, will be found a powerful strengthener of the organs of digestion. Other bitters may likewise be employed for the same purpose. But these remedies seem only capable of removing the slighter forms of Gout, and are not to be relied upon in any severe cases, either of the stomach, or other organs of digestion.

CHALYBEATES are recommended by the experience of the moderns in gouty cases. Musgrave and Warner have given formulæ of steel powders, which they affirm are excellent for driving the Gout from the stomach into the extremities. Their preparations are, in my opinion, inferior to the *sal martis*, or steel wine of the shops. I commonly use the latter, and have experienced a very happy effect from it in many cases. A tea-spoonful in a glass of lukewarm water, makes a very good artificial Bath water. The same medicine is properly conjoined to the use of bitters, and other stomachic medicines in gouty affections of the *primæ viæ*, but I believe the remedy will be found too inert to remove a paroxysm of the extremities.

MINERAL WATERS: The very surprising cures which have been made by the use of Bath waters give them a preference, and pre-eminence to all others. Their temperature undoubtedly assists their Chemical

mical qualities, but independant of heat, they seem to possess a particular stimulant property which is distinct from the Chalybeate Impregnation, or mere temperature. This subtile and powerful stimulus may probably be a species of gas hitherto unknown, or merely inflammable air. The subject appears to me worthy a more minute investigation than it has hitherto experienced from the Chymico-medical philosophers; and there seems to be some reason to believe that a fuller knowledge of the medical properties of the gasses or fictitious airs will considerably improve the practical part of physic. As the bath waters are only to be used with advantage at the fountain head, I shall think it unnecessary to subjoin directions for their use. These are properly procured from the physicians of the place, whose experience enables them to give the best advice concerning the time, quantity, and necessary cautions in the use of the waters. I will only remark, that in every case where the bath waters may be expected to be of

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service, previous purging, and all violent evacuations, in my opinion, are not only unnecessary, but highly prejudicial. I would likewise wish to throw out a hint in the form of a query to the physicians of Bath—"Would not the use of the waters conjoined to the remedies hereafter to be mentioned, during a paroxysm, or external inflammation of the extremities, assist in removing the diseased action of the part, and thus accelerate the cure of a fit of the gout?"

IN certain cases where recourse cannot be had to bath waters, I would recommend the use of any chalybeate spring, cold or warm, but the latter seems best adapted to gouty stomachs, which can seldom bear the use of cold water in any considerable quantities.

IN some instances I have seen the effects of Buxton waters equal to those of Bath. Pyrmont waters are likewise of considerable

able efficacy, and I would recommend their frequent use to all arthritics.

THE remedies already mentioned are principally adapted to the cure of the irregular species of gout, but I now proceed to remark upon those more powerful tonics which may assist us in the removal or

CURE of a regular FIT of the GOUT.

GUIACUM has long been used in venereal and gouty complaints. The wood, bark, and resin of this tree, which is a native of Jamaica, the *Guaiacum Officinale* Linn, are at present in use, but I have met with few practitioners who place much confidence on any preparation of these articles of the materia medica. The decoction of sarsaparilla is preferred to the decoction of *Guaiacum* in Siphylis, and I believe no physician now attempts the cure of any form of gout with this remedy. The resin, or gum, as it is called, is sometimes given in chronic rheumatisms, but I have not

met with any author who recommends it in a regular fit of the gout. I will venture to affirm, however, that it is a powerful and useful remedy. The volatile tincture of Guaicum, the *Tinctura Guaici* of the new London Dispensatory is a very powerful medicine ; it is the solution of a permanent stimulus in a diffusible stimulant menstruum. I have known it given with good effect in that very obstinate complaint, the gouty affection of the neck of the bladder. This fact first led me to try it in a regular paroxysm ; singly, however, I never observed its efficacy, but, aided with the remedy I am next to mention, there is not a more powerful compound in the volumes of ancient and modern Physic.

MUSK is a remedy which deserves the attention of Physicians and Arthritics. I cannot introduce my observations upon this neglected article of the *Materia Medica*, in words more applicable than the following quotation from Dr. Lewis's New Dispensatory : “ Musk, says he, is a grumous substance
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“ stance like clotted blood, found in a
 “ little bag situated near the umbilical
 “ region of a particular kind of animal
 “ met with in China, Tartary, and the
 “ East-Indies. The best musk is brought
 “ from Tonquin, an inferior sort from
 “ Agria, and Bengal, and a still worse from
 “ Russia. Fine musk comes to us in
 “ round thin bladders ; which are gene-
 “ rally about the size of a pigeon’s egg,
 “ covered with short brown hairs, well
 “ filled, and without any appearance of
 “ having been opened. The musk itself
 “ is dry with a kind of unctuousity, of a
 “ dark reddish brown, or rusty blackish
 “ color, in small round grains, with very
 “ few black clots, and perfectly free
 “ from any sandy or other visible foreign
 “ matter. If chewed, and rubbed with a
 “ knife on paper, it looks smooth, bright,
 “ yellowish, and free from grittiness. Laid
 “ on a red-hot iron, it catches flame and
 “ burns almost entirely away, leaving only
 “ an exceeding small quantity of light,
 “ greyish ashes ; if any earthly substances
 “ have

“ have been mixed with the musk, the
 “ residuum will readily discover them.
 “ Musk has a bitterish, subacrid taste,
 “ a fragrant smell, agreeable at a distance,
 “ but when smelt near to, so strong as to
 “ be disagreeable, unless weakened by the
 “ admixture of other substances. If a small
 “ quantity be infused in spirits of wine in
 “ the cold for a few days it imparts a deep,
 “ but not red tincture; this, though it
 “ discovers no great smell of the musk, is
 “ nevertheless strongly impregnated with
 “ its virtues; a single drop of it commu-
 “ nicates to a whole quart of wine a rich
 “ musky flavour. The degree of flavour
 “ which a tincture drawn from a known
 “ quantity of musk, communicates to vi-
 “ nous liquors, is perhaps one of the
 “ best criteria for judging of this commo-
 “ dity. Neumann informs us that spirits
 “ of wine dissolves ten parts out of thirty
 “ of musk, and that water takes twelve;
 “ that water elevates its smell in distil-
 “ lation, whilst pure spirit brings over no-
 “ thing. Musk is a medicine of great
 “ esteem

“ esteem in the eastern countries ; among
 “ us it has been for sometime pretty much
 “ out of use, even as a perfume, on a sup-
 “ position of its occasioning vapours, &c.
 “ in weak females, and persons of a seden-
 “ tary life. It appears, however, from late
 “ experience, to be, when properly man-
 “ aged, a remedy of good service, even
 “ against those disorders which it has been
 “ supposed to produce. Dr. Wall has
 “ communicated (in the Philosophical Tran-
 “ sactions, No. 474) an account of some
 “ extraordinary effects of musk in convul-
 “ sive, and other diseases, which have too
 “ often baffled the force of medicine.
 “ The Doctor observes, that the smell of
 “ perfumes is often of disservice, where
 “ the substance, taken inwardly, and in
 “ considerable quantity, produces the hap-
 “ piest effects : that two persons labour-
 “ ing under a subfultus tendinum, extreme
 “ anxiety, and want of sleep, from the
 “ bite of a mad dog, by taking two doses of
 “ musk, each of which was sixteen grains,
 “ were perfectly relieved from their com-
 “ plaints.

“ complaints. He likewise observes that con-
 “ vulsive hiccups, attended with the worst
 “ symptoms, were removed by a dose or
 “ two of ten-grains: and that in some
 “ cases where this medicine could not, on
 “ account of strong convulsions, be admi-
 “ nistered to the patient by the mouth, it
 “ proved of service when injected as a
 “ glyster. He likewise adds, that under
 “ the quantity of six grains, he never
 “ found much effect from it; but that
 “ taken to ten grains and upwards, it
 “ never fails to produce a mild diapho-
 “ resis, without at all heating or giving
 “ any uneasiness; that on the contrary it
 “ eases pain, raises the spirits, and that
 “ after the sweat breaks out, the patient
 “ usually falls into a refreshing sleep; that
 “ he never met with any hysterical person,
 “ how averse soever to perfumes, but
 “ could take it in the form of a bolus,
 “ without inconvenience. To this paper
 “ is annexed an account of some farther
 “ extraordinary effects of musk, observed
 “ by another gentleman. Repeated expe-
 “ rience

“ rience has since confirmed its efficacy
 “ in these disorders. I have myself fre-
 “ quently given it with remarkable suc-
 “ cess; and sometimes increased the dose
 “ as far as twenty grains every four hours,
 “ with two or three spoonfuls of musk
 “ julep between: the julep is the only
 “ officinal preparation of it.”* The Mis-
 tura Moschata of the Pharmacopœia nova
 Londinensis is similar to the julep with
 the proportion of two scruples instead
 of six grains of musk, and the addition of
 one dram of gum arabic, to six ounces of
 rose water. But these preparations I hold
 to be very inefficacious. Water is not a
 proper menstruum for this active remedy.

VOLATILE ALKALI is a powerful dif-
 fusible stimulus, possessing many properties
 which recommend it to arthritics. The
 volatile alkaline salts, and their solutions
 called spirits, prepared from different ani-
 mal substances have been supposed capable
 of producing different effects upon the hu-

* Lewis's new Dispens. p. 178, 9.

man body, and to receive specific virtues from the subject. But modern practice and chemical experiments have proved their identity. In whatever form therefore the volatile alkali is given, we may expect from its use the same general effects. Experience has shewn its efficacy in a great variety of nervous diseases, and there are instances on record where this remedy has removed obstinate intermittent, and remittent fevers, where the bark has failed.

The SPIRITUS AMMONIÆ COMPOSITUS, or SPIRITUS VOLATILIS AROMATICUS, is one of the most grateful preparations of volatile alkali; a tea-spoonful in a glass of water is a pleasant and powerful stomachic medicine in gouty cases.

ÆTHER has been recommended in gouty complaints; it is of two kinds, vitriolic and nitrous. But I have not been able to discover any good effects from the former of these preparations in the regular gout. The latter I have not tried. In one case of
spasmodic

spasmodic difficulty of breathing, which resembled a gouty dyspnæa, I found the æther vitriolicus, in large doses, of service ; but I am of opinion that it is much inferior to the volatile alkali, and it is not improbable that the acidity, however weak and subtile, may render it unfit for gouty stomachs.

ANTIMONIALS are among the most powerful remedies, which the science of medicine can boast. They produce effects which philosophy is puzzled to explain. They frequently remove the most dreadful maladies in the most expeditious manner ; and they seem to operate as it were by a charm, on the most remote and important organs of life. The wanderings of intellect delirium, and the most alarming stages of febrile debility, fall within the compass of their operation : spasms, convulsions, pain, are within the sphere of their action ; diseases or debility of the animal, vital and natural functions, are within the scale of their power ; and all their effects place

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them

them among the most active stimuli, which discovery has yet applied to the living system. Of their efficacy in the gout, we are to speak more particularly. Evacuation, we have pronounced hurtful in every stage of this complaint; such effects of antimonials are therefore to be guarded against; their tonic virtues are objects of our attention. We find in fevers that the morbid celerity of the pulse is checked, and the idiopathic debility removed by their use without evacuating effects; hence analogy pleads in their favour. I am indebted to a very ingenious and learned friend for some important practical remarks on this subject. Dr. Palmer, Physician at Peterboro' attended me in my first gouty paroxysm. The attack was irregular, my foot, lungs, and neck of the bladder were alternately affected; I had much fever and restlessness; he gave small doses of an antimonial powder, (a substitute for James's powder) with the happiest effects, and he informs me that in all cases of irregular gout he finds this remedy efficacious.

ous. Until the seat of the fit is fixed he gives a small dose every three or four hours, which, without vomiting or purging the patient, lessens the fever, and seems to shorten, or sometimes to remove the paroxysm. I must confess, however, that I have never been able to cure a regularly formed fit of the gout with any antimonial preparation singly, but if I am not mistaken, I have seen its happy effects when conjoined with other remedies.

OPIUM, if we may believe a bold systematist, is the long sought for panacea in the gout, and a long list of dreadful maladies. It is undoubtedly a remedy of great powers, and has effects which strongly recommend it to the attention of arthritics, but it has properties which alarm the patient, and make the cautious practitioner afraid of its use. Experience, however, informs us that it may be given in considerable doses with advantage. And the same experience shews that danger may arise from the administration of this remedy,
even

even in cases where theory and practical analogy pleaded in its favor. The qualities of opium seem to require chymical illustration ; it is a compound concrete milky juice collected from the poppy, and as the best sort is brought to us from Egypt, Persia, and other hot countries, it would seem that a considerable degree of heat is necessary to produce it in a state of perfection. The chymists have related their experiments upon this concrete juice, but they do not appear to be determined upon the nature of its active principles, nor have their labors been sufficiently attended to by practitioners. Water is said to be its proper menstruum, yet wine is preferred in the dispensatories. From several experiments which I have made upon the subject, I am inclined to believe that as this substance in its medical effects resembles the Peruvian bark, so in its chemical qualities it bears the same affinity. An active bitter resin, and an astringent gum seem to constitute its principles. A cold watery infusion of opium, joined with some warm aromatic, appears

appears to me the best method of obtaining its pure anodyne effects, without danger of those noxious and alarming consequences, which frequently oppress the patient under the forms of head-ach, sickness, and bilious vomitings, &c. when given in substance or spirituous tincture. With respect to the use of this remedy in the gout, there can be no doubt that it is often highly useful ; and whenever the pain is so severe, as to prevent sleep, it is necessary and proper to procure it with this remedy. But I would prefer the watery infusion to any other mode ; a grain of opium infused in an ounce of weak cinnamon water and the infusion may be taken in divided doses, so as to procure rest, or it may be conjoined with musk in substance, and a draught with some of the volatile tincture of guaiacum given after it. The dose of opium will be regulated by the skill of the physician, small doses frequently repeated, seem preferable to large ones. One great inconvenience arising from its use is costiveness. Unless this be guarded against, the distressing

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ing symptoms of a gouty paroxysm will be aggravated by the administration of opiates.

HYOSCYAMUS or Henbane appears as an anodyne, to be preferable to opium ; I have frequently given a grain or more of the extract merely with a view of procuring rest, in those complaints where Opiates are usually given, and I have observed the best effects from its use. Neither costiveness, sickness, head-ach, or any of those other distressing symptoms, which often ensue a dose of opium, are amongst the common effects of henbane. But unfortunately this remedy has been rejected at the College ; when that learned body shall think proper to give it a PUBLIC examination, perhaps it may be more fortunate.

ELECTRICITY, In treating of the theory of the gout, we endeavoured to shew that it was a disease, which from analogy, seemed to require the use of strong stimulants to its cure. We compared it from a
general

general view of the symptoms to a febrile paroxysm of the intermittent or remittent type ; and we have endeavoured to prove that the *debility* of the living solid, which is the cause of the symptoms, is to be removed by the proper use of *stimulan* remedies. Electricity is one of the most powerful of this class ; and, as a power capable of a diversity of effects, deserves our serious consideration. An insulated living animal charged with the electric fluid, is found to be in a stimulated state. The circulation is quickened, and the action of every part increased. On the sudden escape of this subtile fluid from any part of an animal body thus insulated, on the approach of a non-electric, or negatively electrified body, a peculiar shock or stimulus is felt in the part ; and thus the stimulant effects of electricity may be locally as well as universally applied. This remedy is of great use in many local complaints. Applied in shocks, or taken from an insulated animal in sparks, it is found a powerful

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erful means of restoring the lost tone or action of a part. With this view I would recommend it to the attention of arthritics; and I am of opinion that the regular gouty paroxysm might be safely relieved by its application. If the patient were laid upon an insulated couch, and had gentle sparks drawn from the inflamed part, or merely made to feel the electric *aura* by means of a pencil or sharp pointed substance held at a distance from the inflamed surface, I am persuaded, that it would be found of real use in restoring the lost tone of the part.

In those cases where the lameness continues, though the pain and swelling have abated, it has been tried with success, and as the same cause only in a more violent degree, gives rise to the aggravated symptoms, philosophical argument would seem to countenance this conjecture.

I shall

I shall here conclude my observations and advice to arthritics. Much might be added to what I have said, but brevity is required. The martyrs of Podagra—The afflicted sufferers of the gout, will rejoice in the proof of my opinions; and thousands, will be happy to hear that the *complaint* under which they labour, is *curable*. I speak not from theory or conjecture alone. I speak from practical experience, and I venture to affirm, that, in a given number of *fits* of the gout and *ague*, an equal proportion of the former may *be cured*.

I have frequently removed a regular attack of the gout in the extremities, in a few hours; and seldom met with cases which required more than a few days. My example in physic is ASCLEPIADES---He founded a system of Medicine on the basis of philosophical enquiry; and whatever may be my pretensions to a similar attempt, I will religiously follow his maxim, and
endeavour

endeavour to cure my patients “*tuto, celeriter, & jucundè.*”

R. KENTISH, M.D.

Gower Street, Bedford Square,
London, Jan. 1, 1789.

F I N I S.

E R R A T A.

Page 45, read *Eggs* commonly agree well

47, for *accompanies*, read *accompany*

48, for *although*, read *though*, & *ubique*

59, for *quanity*, read *quantity*

85, for *earthly* read *earthy*

91, after *intellect* a comma

95, read *may be infused, &c. and the infusion taken*

